THE METAL INDUSTRY
WITH WHICH ARE INCORPORATED
THE ALUMINUM WORLD, THE BRASS FOUNDER AND FINISHER AND ELECTRO-PLATERS REVIEW
A TRADE JOURNAL RELATING TO THE NON-FERROUS METALS AND ALLOYS.

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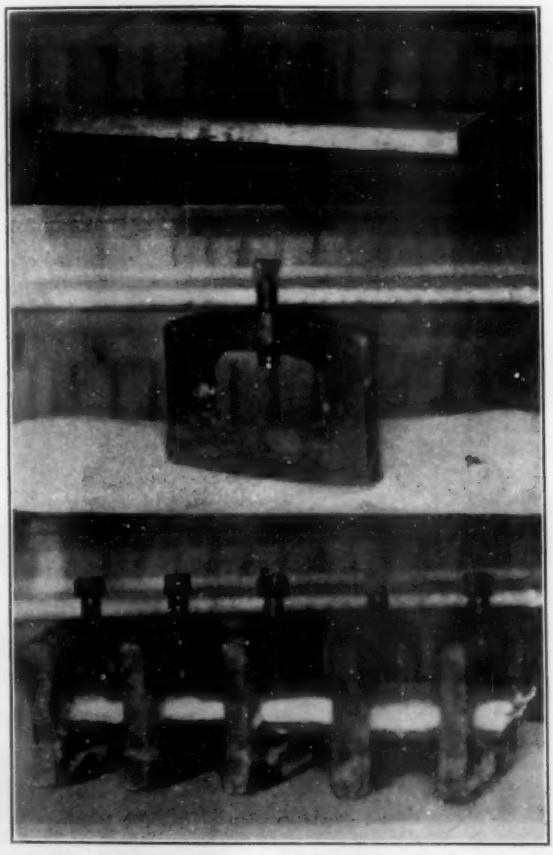
# THE MANUFACTURE AND USES OF ROLLED GOLD PLATE.*

By J. T. Boland.

Gold plate is without doubt the most interesting flat stock manufactured and the fact that particular care must be given to each process makes it more so.

The gold used is U. S. Government gold, which is .997 to .999¾ fine. The fine gold is reduced to whatever



THE BAR, CLAMP AND BAR IN CLAMPS.

karat one may require to suit the work for which it is to be used. One may use 10K, 12K, 14K and so on, but as 18K seems the best we might say it runs from 8K to 18K gold. Whichever karat one decides to use, it must first be melted, then poured into an ingot that will roll out long enough to cover the composition bar which he is to plate.

If the bar is 15"x4½"x¾" one must have gold enough to cover the bar and the amount used will depend upon the quality of stock you wish to make.

*These photos were taken at the works of the United Wire & Supply Co., Providence, R. I.

If you want ½-12K or 1/500-12K, you will see the quantity of gold you melt depends upon the quality of the plate you wish to make.

Fig. 1 shows a bar of metal 15"x4½"x¾". The gold is rolled to cover one side of the bar. The thickness depends upon the quality you wish to make. When the gold has been rolled to the thickness you have figured upon and the desired quality made cut it 15"x4½".

Then the gold is to be cleaned, which is done by scraping or by using emery cloth.

U. S. GAS PLATING FURNACE.

The next step is the solder, which must be about the same size as metal and gold, 15"x4½", and about .003 or .004 in thickness. Your own judgment must be used here and experience will teach you the necessity of having the solder well cleaned on both sides.

Now that we have the gold and solder, the metal must next be cleaned.

After the gold, solder and metal have been cleaned we must be very particular not to touch the parts cleaned with the fingers as, if we do, the solder will not amalgamate with the gold and metal. Next cover the pieces cleaned with borax and lay the solder on the metal and place the gold on the solder. This being done, a piece of Norway iron is placed on top of the gold and it is now

ready for the clamp which is shown in Fig. II. This clamp is made of malleable iron.

Fig. III. Now that you have the stock well clamped, borax is put around the edges of the gold and metal. It is then put into a plating furnace, Fig. IV., and heated until the solder is seen to flow along the edge where you had put the borax. When you see that the solder has been all melted the stock is allowed to cool, after which the clamps and the flat piece of iron are taken off.

Then the ingot of gold plate is pickled off so as to dissolve the borax. When this is done it is ready for rolling. The rolls used must be very smooth as you can see it is different than if you had an ingot of composition with no gold on it, for the fact that when the gold is on the metal care must be taken not to have any dust or dirt rolled into the gold as it may not stand acid. When the dirt is rolled into the gold it may cut through into the composition. The ingot can be widened to any width you wish or can be rolled the width you have plated it. Now the stock is annealed at different thicknesses the same as any other of the like mixtures except that you are to use boracic acid to cover the surface of the gold, so that when it is cooled and the stock is pickled the stock is bright and free from oxide. It is then finished in rolls which have a mirron finish—that which is absolutely smooth before it is put into anything for which it is to be used. It is used for umbrella handles, cane heads, sleeve buttons, collar buttons, watch cases, lockets and in fact for anything where a piece of flat stock is required.

The bar to which the gold is soldered is what is known as a plater's bar and varies in the mixture. I have made an analysis of one which is: Copper, 92 per cent.; zinc, 7 per cent.; tin, 1 per cent.

The composition of the solder also varies, but as a rule is a silver solder. One might use an alloy as follows: Silver, 75 per cent.; copper, 20 per cent.; zinc, 5 per cent.

The pickle is made from oil of vitriol which is tested with an acid hydrometer and is 65°; you are to dilute it to about 19° with water. It is made in a lead-lined tank, with a coil of lead pipe in the bottom and is heated by steam, so that you can keep the solution at a boiling point until the stock is all cleaned off.

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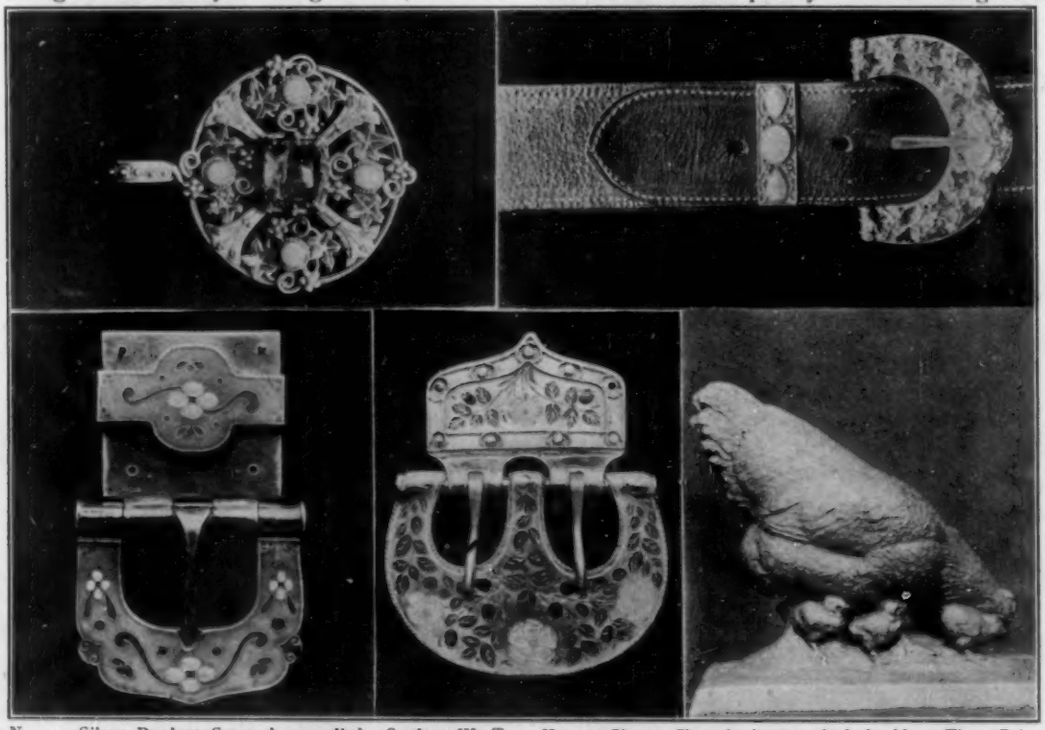
## BIRMINGHAM JEWELLERS' SCHOOL—THE ANNUAL EXHIBITION.

By Our Birmingham Correspondent.

The annual exhibition of jewelry students' art work at the Birmingham Vittoria Street School was opened on January 15th, and was visited by very large numbers during the three following days. The Metal Industry has previously exhibited photos of samples of the students' work, exhibiting artistic ability of a high order, but it is generally agreed that this year all previous efforts have been surpassed. The work has been done under slightly different conditions, arrangements having been made with the Birmingham Education Committee to admit a number of boys from the Icknield Street Council School as a recognition and an encouragement of their natural aptitude for art craft, the opportunity of course being given to those who intend to become jewelers or metal-workers. Before leaving the Council Schools they will spend one half-day a week at Vittoria Street Art School, eventually taking the entire artistic course at the latter institution. It is hoped by this means to give them an all-round training which will be of the highest service in their subsequent careers.



No. 1.—Silver Pendant Set and enamelled. Student W. T. Blackband; awarded Gold Medal in National Competition.

No. 2.—Silver Belt Clasp mounted on leather, applied enamelled work. Set with pearls. Student W. G. Randall (age 18); awarded price of £10.

No. 3.—Silver Cloisonné enamelled belt clasp, by Bernard Whitehouse.

No. 4.—Silver Champlevé enamelled buckle. First Prize. By H. T. Tonks.

No. 5.—Cast Paper Weight by Lost Wax Process (*cire perdu*) moulded and cast in bronze by the student. This work has not been chased or touched since taken from mould. Student Violet Fey (age 18). First Prize for Casting.

The school has for years past been famous for its life drawings from nature, and of this work H. Wilson, the examiner, once more speaks in terms of enthusiasm. Some of the pencil pictures of birds and animals, says

Mr. Wilson, have realized "an intensity of expression almost Japanese." The subjects deal with plants, flowers, animals, insects and human figures.

Dealing in detail with the work submitted to him for examination, Mr. Wilson states:

"The jewelry work is excellent in all its branches, from the most elementary essays of beginners to the elaborate and beautiful work shown by the more advanced students. * * * * The buckles, clasps and pendants are really made for wear, and they gain thereby an added beauty—that sense of fitness and completeness without which the most beautiful design fails to satisfy. The same must be said of the metal work. The small silver jugs and bowls are all simply designed, admirably made, and entirely pleasant to look upon. The work of the enamelling class gave me very great pleasure not only because it is beautiful in itself, but also because it escapes the great defects of the present revival in enamel work, the inability of most enamellers to rise beyond the tiresome plaques, mounted anyhow, and the still more tiresome sham jewels, which always look out of place and incomplete. * * * * The examples of enamelled bowls and vases shown by the students indicate a welcome return to a long-neglected tradition, doubly welcome as the sign of healthy teaching, and as the promise of a real revival in the application of a beautiful material to things of daily use."

No. 6.—Silver Champlevé Enamelled Cup raised and enamelled by Student E. Cole.
No. 7.—Silver Champlevé Enamelled Box. Student B. Hunt.
No. 8.—Back of Box, by Hunt.
No. 9.—Raised Brass Jug, by Lewis Instone.
No. 10.—Copper Repoussé Plate, by Oliver Gladman.

Among the drawings from life the pupils have shown great ability to appreciate the sense of movement. Percy H. Cooper, a boy of 16, takes the first prize in this section with several studies of rabbits, pigeons and fowls. A clever study of a turkey by Howard F. Tonks, which was not in the school competition, has been commended in the National Competition. Shirley G. Good takes a second prize in this department, F. C. Alabaster and E. R. Wright being placed equally third. In this department the beauties of fur and feather are very cleverly represented. For time and memory drawings Percy H. Cooper and Frederick Wood are bracketed together for the first prize. There are some effective drawings of butterflies by boys of fifteen and sixteen, the first prize for pencil work being shared equally by Fred Wood and Joseph Allaway. The students have shown a great appreciation of color, and the examiner, who advocates the use of brush and color by the more advanced students, observes that the color and texture shown in these drawings would be surprising if one had not grown to expect them. The work of Alfred Smith and Richard Claffer has been commended in the national competition.

In human life drawings there were some beautiful examples. Charles Thomas has been awarded a national book prize for a beautiful study of a head, and the examiner says that the work of the local prize winners is worthy of high praise. T. L. Temple receives a first prize for a set of three portrait studies of a young girl, and H. T. Tonks, the second prize winner, exhibits an admirable picture of a girl reading.

From the practical point of view, the work of the students in applying their art studies to original metal decorations will be closely examined. The examiner's views on this subject have already been quoted. The students have succeeded in turning out some very charming work. An elaborate filigree necklace made by Carrie Copson during the holidays is a work of patience, of most intricate design suggestive in some respects of Oriental work. Very high praise is given to a buckle which in richness and design of enamelling strongly suggests Japanese art, and yet is said to be entirely original, resulting from the student's fresh outlook on natural art forms. For this buckle B. Whitehouse has been awarded the first prize; yet H. F. Tonks is bracketed equally first for a steel buckle prettily pierced and carved. In a class for enamelled bowls J. Duncombe receives a prize for a simple vessel notable for its richness of surface and enamelled coloring. All the metal work shown is excellent, and a national silver medal has been gained by Lewis Instone for a jug. Charles L. Allison wins a national bronze medal for a copper kettle and stand. The fine examples of work are really too numerous to mention, and it is dif-

ficult to avoid being invidious, but special mention must be made of a casting of a hen and chicken to be used as a paper weight, which is the work of Violet G. Fay, a girl of 18.

The modelling and die sinking are entirely satisfactory, a specimen by W. H. Harris, which takes first prize, being altogether admirable.

Mr. Wilson concludes his report with some most important suggestions. He proposes that there shall be a series of lectures on subjects specially chosen to stimulate the imagination of the students. He also urges that the admirable series of demonstrations by Mr. Kobayashi, results of which in the shape of essays in metal coloring he studied with the greatest interest, be continued, not necessarily by a Japanese, but by any skilled foreign craftsman who could be induced to give demonstrations of his method and practice. It should even be possible to arrange, with the sanction of the Board of Education, perhaps even with their co-operation, that one or more foreign artists be brought to England, and settle for longer or shorter periods, to work in one or other of the chief art schools in London and the provinces, the expenses being shared in due proportion by the schools concerned.

## THE BRASS FOUNDRY VS. THE MACHINE SHOP.

By William H. Parry.

In their efforts to cheapen the cost of brasses and bronzes during the recent high priced market for the constituents of the non-ferrous alloys, the foundry metallurgists resorted to means never before attempted and, after all is said and done, it would have been better for all concerned if they had never been attempted.

To cheapen a brass or bronze regardless of machine shop requirements is commonly known as "bung hole economy" as, while the foundry "spigot" may have stopped leaking, the brass finisher "bung hole" is wide open, and a generous flow in the shape of broken and clogged tools is issuing forth to the dismay of the powers that be.

There are certain well defined rules for the mixing of non-ferrous alloys that have been tried and not found wanting, and the closer we stick to them the better off we shall be; though, that there is something still to learn is indisputable.

Perhaps to better elucidate my contention let us consider a few cases that have come under my own observation recently, just to show that while it is commendable to save at the foundry end, it is just as well to remember that the finisher of the castings, and the firm who employs both, have some few rights that we are in duty bound to respect.

*Number* 1. It was found that in casting phosphor-bronze engine bearings of heavy section, cylindrically shaped and flanged on each end, that the bore was a mass of fins projecting inward, this being due to the "cutting in" qualities of this alloy when certain core sand was used. The machine shop, in boring out these castings, had to resort to every known and some heretofore unknown methods to get a cut started and then hold it. After several attempts, using the best high speed steel at that, it was given up as a bad job, the fins and core sand in combination proving too much for the tools.

A consultation was held and after discussing things pro and con, and examining the castings, it suddenly occurred to one of the conferees that the outside of the castings were clean, and as that part of the metal came in contact with the green sand, why would it not be better to make the core of green sand too. This was done and the resulting castings were good, both in and out, and the subsequent boring and turning left nothing to be desired.

*Number* 2. Castings that had heretofore shown up the brass finishing floor in good shape suddenly developed a bad case of porosity when finished, though the castings in the rough looked good. The foundry foreman swore that he used exactly the same formula he always had and could not account for the change in the complexion of the castings. An investigation proved that the purchasing agent of the concern had bought a consignment of Japanese copper at a price many degrees below the prevailing market temperature—and he considered this move the master stroke of his career, and it was.

As a counterstroke we were compelled to use more spelter and some silicon-copper so as to use up the stuff that was smelted in Japan, and remelted in our own glorious country and sold as American copper; a sad reflection on the honesty of at least one of our home product of metal jobbers.

*Number* 3. In an effort to cheapen an alloy so that the price of the finished piece would not have to be increased, it was determined to cut out the use of tin entirely and depend upon the hitherto unknown qualities of aluminum to take its place. After some very elaborate experimentation that proved there "is nothing like tin," the result was that they were glad to get back to the old formula; yes, and add a little more tin too, and the price of the finishel product was increased accordingly, without a murmur from the jobbers, though I won't say what the consumers said when they paid the bills.

It was learned from these experiments that aluminum is a dangerous metal to alloy with copper, spelter and lead if the machine shop is to be considered, to say nothing of the foundry end with the increased shrinkage to contend with, though with care this can be remedied, something we were totally unable to do when turning, drilling, or tapping the castings, as there was a "cling" to the metal that all the oils and turning compounds in the universe could not get rid of. As a result a great many tools were spoiled and good time wasted.

*Number* 4. An order for some thousands of a certain casting was given and but few had been made when it was discovered that one operation in the machine shop that appeared simple when planning the work, was anything but easy to accomplish. It was the milling of a peculiarly shaped port in a water valve; a third of the milling cutter surface only was in actual contact with the work, the result being a botch job either by using mills with helical or straight flutes.

A consultation was held and the patternmaker suggested that we cast the ports and do away wth the milling machine work. After some hesitation it was so decided and what appeared to be a hopeless case was changed to one of the easy kind by a very insignificant change in the pattern.

*Number* 5. Some years ago when copper and brass vacuum pans for the boiling of sugar were in style, and, by copper and brass I mean that these metals were used entirely and not as mere linings such as are used now in connection with cast iron water shells, it was my privilege to participate in the making of the

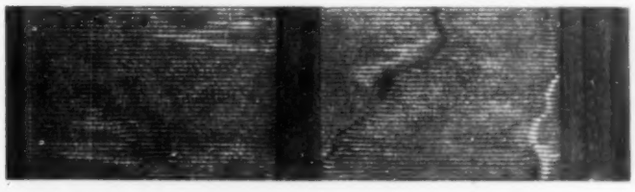
pattern for the lower section. This was to be cast in bronze and was to weigh in the neighborhood of 3 tons. Now the bidding for this casting by the local foundrymen who could handle same was somewhat spirited and, when the contract was let to a rank outsider there was much wailing and gnashing of teeth among the disappointed bidders; but they were somewhat consoled by the knowledge that at the price agreed upon it would be impossible to realize a profit unless the metal was stolen. The casting was made and delivered and while the specifications called for a fair steam metal, the color of the casting was of a very light saffron. As considerable machine work was to be done it was thought advisable to start drilling a few holes as a precaution, when it was found that the casting was as hard as flint and readily turned over the edge of any cutting tool applied to it.

What the alloy was I am unable to say, though it seems a pity that the mixture was forever lost, even though it provided another object lesson that proved that while most foundrymen believe in their right to produce bronze and brass castings regardless of machine shop requirements, it is to our credit as a nation of believers in "the square deal" that we insist on the production of castings that can be machined with facility.

## NEW METALLIC WALL COVERINGS.

By L. E. Taylor.

The subject of mural decoration is one of the greatest importance. Stucco has been extensively used from very early times and was held in great favor by the Moors, who employed it, in conjunction with painting and moulding with the happiest results. Of late years there has been a tendency to revive the art, but although the attempt has met with some measure of success, the climate of Europe, generally, prohibits its wide adoption and, in common with sculpture it readily retains dust, which proves a serious objection to its utility in towns. The Persians employed glazed tiles and bricks with great skill, building up by this means wall pictures of brilliant and harmonious coloring. This material being practically indestructible and easily cleansed, although quite unsuited for the dwelling rooms of private houses, is used more than ever to-day in public buildings. Throughout the whole of the Middle Ages the only wall covering of importance in private houses consisted of the famous and still popular tapestry. In the ill-built and draughty abodes of our forefathers this form of wall covering did much to temper the chill bareness of massive mason work and ill-fitting although ponderous doors. Its use in the present day, setting sentiment on one side, is an anachronism, for with all its splendor it is a dust trap and microbe holder of the worst kind, as our ancestors realized with regard to the spread of plague.



METALLIC WALL COVERINGS.

Quite recently a new form of mural decoration has been brought out in England in the form of metallic wall coverings. Yet the utilization of sheets of metal for decorative purposes is not solely a modern invention. King Solomon overlaid the walls of the Temple with fine gold and Homer describes the brazen plated halls of his heroes. The temples of Cuzeo were also rich in golden platings. These plates were laboriously hammered out and affixed by nails and probably owed more to the material than to the workmanship for their striking effect.

The new metal wall covering is made continuously by an electrotype process. It is damp-proof and practically air-proof. A room covered internally with the metal is ventilated only by the appropriate means appointed to secure that end. The lining of a wall by an impervious material effects a further important result in diminishing dampness. Rain falling upon a wall is absorbed largely by means of capillary attraction. Under general conditions much of the imbibed moisture passes right through the wall and is given off by evaporation from its inner surface, doing considerable damage to the wall paper in its passage. An impervious layer on the internal surface tends to arrest the capillary percolation of the moisture and prevents undesirable evaporation into the room.

The new copper wall covering claims to have a germicidal action. In the first place it presents no suitable environment for the growth of bacterial colonies, so that the individual germ remains an individual.

It, therefore, proves that a surface covered with metallic copper is practically germ-proof and further that such a surface will probably destroy any germs that effect a lodgment upon it. Apart from this advantage in improving the sanitary condition of dwelling houses it suggests an application of considerable value in hospitals and sick rooms. In these instances it is understood that the copper would not be superficially protected from oxidation by means of lacquer and preferably it would not be covered with embossed ornament. The material may be sulphided, oxidized or given by chemical means different patinas of beautiful color and highly decorative value without injuring its germicidal properties.

The new metal wall covering is a distinct improvement over that of stamped leather. This most expensive material found favor among the rich in the 16th and 17th centuries. This magnificent hanging is frequently painted by hand, embossed and varnished and its clever imitation to-day is found in embossed and colored paper.

## SOLID CASTINGS.

By John Honan.

I herewith present a half-tone of a solid casting and also a sketch of the face or ornamental side of a mold for producing solid castings. This mold will turn out castings without dross, or pinholes, or other defects which

CASTING.

are caused by the common way of gating work. I use beveled gated molds to get this clear work, with the gate piece extending 4 inches above the face of the mold. The upper end of the gate is beveled backward from the

Mold with wooden handle on top, or back piece in working position.

MOLD.

lower edge at a distance of 1 inch, or in other words the bevel is 1 inch to 4 inches.

I have tried various ways for over 20 years to get clean and solid work and have not succeeded in doing so until within the past six months; now I can get just as good results on large work as on small, the shape being immaterial, and can produce castings at one-half the cost by the ordinary methods.

## SLUSH MOLDS.

By John Honan.

I wish to reply to Charles H. Proctor's item in your December number, 1907, in regard to the mixture of lead and antimony. I have found it impossible to get good slush castings with 12½ pounds of antimony to 100 pounds of lead. The above amount of antimony will not give the life required for the lead to run good castings, and will show dead white spots on the surface of the work. Fourteen pounds of antimony to 100 pounds of lead will produce good common slushed work, while 18 pounds of antimony to 100 of lead will run sharper and look brighter.

Referring to one-piece mold for a back, a common cardboard from ⅛ to ¼ inch thick will give the best results, as it retains the heat better than asbestos and is not so apt to chill the metal; the castings will run easier and look sharper. It is best to smoke the card with gas or lamp.

In preparing molds for use they should be heated gradually and they will turn various colors. Heat until they turn to a dark brown color. Now we have a running surface; let the pieces cool a little less than the heat of the metal and proceed to run castings. I have found hard coal to give the best satisfaction in heating the molds; or if using a gas furnace place the pieces over the flame; if they are too large to put inside the stove or furnace you may hold them in the metal, face up. Care should be taken not to allow the metal to come in contact with the face, as the metal will stick fast.

In making slush molds for clock cases, candlesticks, jewel boxes, etc., it is not necessary to vent the molds if the cores are properly made by the mold maker and held at the right angle while casting. The system of making box molds has been changed to a great extent within the past twenty years by American mold makers, and the same may be said of solid work.

In the making of box molds for slushed castings and medium sized work, all the pieces except the core should be at least ½ inch thick. The core piece will act better at ¼ inch thickness at the pouring end and then should be tapered to the thickness of the other pieces at the casting end. The core piece requires more heat than the other pieces and this method will give it a chance to heat faster and leave less surplus metal to trim from the castings and there will be less labor. For very small molds ⅜ inch thickness will do. The main part is in the making of the plaster molds, in cutting the pieces a uniform thickness and especially in providing the proper drafts so the pieces can be drawn freely from the sand box.

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Honduras has placed a tax, commencing last December, of 12 per cent. of its value on crude silver exported from the country, and a tax of 2 per cent. of its value on gold in bars or dust exported from the country. These regulations do not apply to enterprises that have concessions granting them free exportation of their metals.

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According to press despatches the reopening of the Butte mines of the Amalgamated Copper Company on the 2d was decided on in the belief that the demand for the metal will increase within the next few months to a sufficient extent to warrant this move. It was argued that the ore which is now taken out of the mines will not be reduced to copper and the metal placed in the hands of consumers until next summer. It will probably take a full month to bring the mines up to full capacity, mainly because the force of workmen can only be increased gradually.

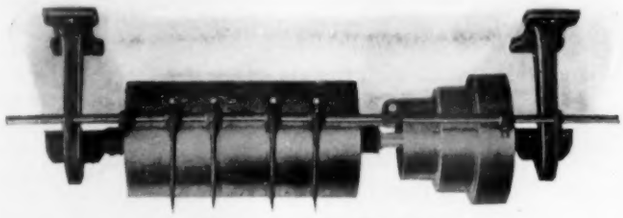
# THE TURRET LATHE AND ITS EQUIPMENT.

By Easy Way.

(*Continued from page 44.*)

## The Line Shaft.

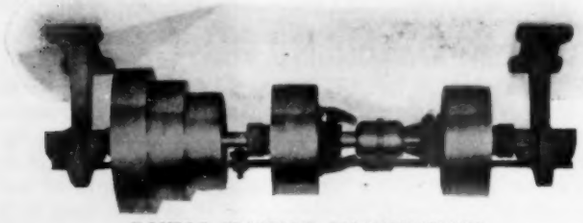
The line shaft should be sufficient strength to be equal to all strains put upon it. The separate lengths should be coupled together by well designed compression couplings, note being made of the fact that the higher the speed of the shafting the smaller the diameter required; it is not wise to get shafting too small for the work it has to do. A speed of 250 revolutions per minute is good practice.



PLAIN COUNTERSHAFT.

For the smaller work the pulleys may be 20 inches in diameter for the ungeared machines, and 16 to 18 inches diameter for geared friction head machines. The hangers should be of the adjustable swivel pattern with generous lubricating qualities, for poor lubrication means expensive power bills and other troubles.

A line shaft can be the correct size and still give a great deal of trouble if it has not been properly installed. One good way to test for alignment is to throw off all the belts and find what is the smallest diameter it can be rotated by hand. If it is 2 inches or over in diameter and 60 feet long and can be turned by grasping the shaft it is O. K.



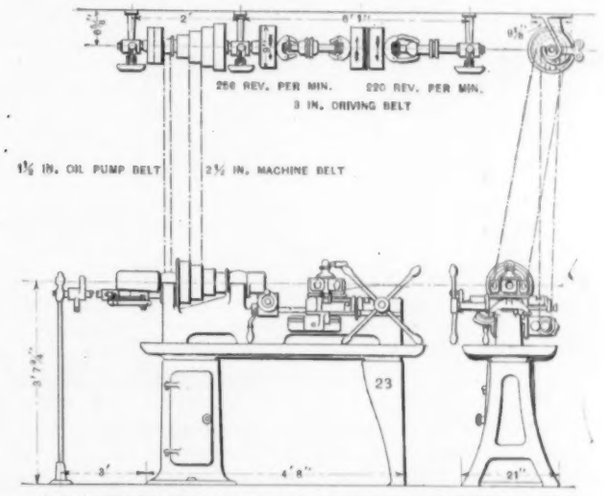
DOUBLE FRICTION COUNTERSHAFT.

The next important thing is the belting. This should be the best oak tanned leather belt, and if funds will permit double belts are preferable. The hair side should face the pulley. The belt should be laced in a thoroughly substantial manner, the width of the belt being gauged by the face of the driving pulley or clutch on the countershaft. A good rule when putting on new belts is to measure the exact length and then shorten ⅛ of an inch per foot to allow for stretch. The countershaft, before being installed should be stripped of the hanger, clutches, or pulleys, as the case may be, and all parts thoroughly cleaned; the omission of this may cause serious trouble later. The countershaft must be placed in a substantial manner, and must be perfectly level and parallel with the shaft. If there are two rows of machines to be driven from the same shaft the longest drive should be approximately 14 feet and the shortest 9 feet.

The next important thing is the placing of the belt shifter or the clutch. This should be placed in such a manner that it does not interfere with the operation of the machine and still be handy for starting or stopping or reversing. Also, it should stop in any position in which it is placed and still be not hard to operate. If the work is heavy it will pay to use double belts. New belts should be watched carefully, as they are quite apt to develop some fault which the maker cannot detect before the belt is in actual operation, but who would be willing to replace it if the fault were early brought to his attention.

## Duplicate Manufacturing.

The first thought before we start to manufacture is to form a basis for exact duplication in a thorough and systematic manner. Eli Whitney, of New Haven, Conn., in the year 1798, had the honor and distinction of originating the modern manufacturing system, as at that time he




COUNTERSHAFT AND BELT PLAN FOR TURRET LATHE.

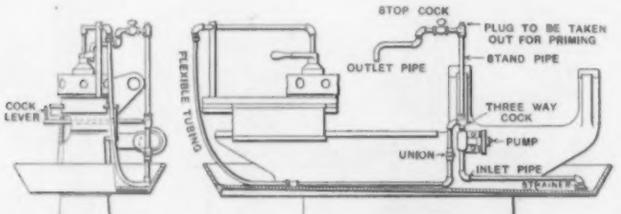
received an order from the United States Government for 10,000 muskets, 4,000 to be delivered in one year and the balance in two years. Mr. Whitney encountered more gigantic obstacles than he had ever dreamed of; consequently it was eight years instead of two before the order was completed. Notwithstanding all the delay this genius won the esteem and admiration of the Government officials as each part manufactured fitted with such exact nicety there was no room for complaint. It was in the manufacture of those muskets that Mr. Whitney conceived and put into operation ways and means for duplicate production of parts to a limited degree of variation which permit of their interchanging. Thus we must begin.

In mentioning interchangeability it must not be inferred that the system is only meant in the production of fine work; on the contrary the fact is that the system is easier of installation and of as frequent occurrence with rough work. There is an art in manufacturing: the first is, produce cheaply; second, uniformity in duplication; and this is what I will endeavor to explain in an easy way.

As a practical illustration of what the modern system of manufacturing consists of and how it is installed and carried on, I will take up the various arts called into use and necessary to the successful construction and placing on the market of a lubricator for which there is a large demand and which most all brass shops build. After the developing and experimenting have reached a successful

conclusion in a perfect working model, the first thing is the making of a full set of wood and metal patterns and core boxes, to be used for casting the various parts which are to be cast. The man that does this must call into play a vast amount of ability and knowledge in order to accomplish his part of the work. He must allow all parts being sufficiently strong so that the castings resulting will withstand all strains to which they may be subjected when in use and yet not have a waste of metal improperly placed; and he must provide for giving them as far as possible a systematic and artistic appearance. He must allow for shrinkage in the metal when cast and for a certain amount of surplus stock at all points which are to be machined and finished.

After the patternmaker has produced the patterns in exact duplication of the designer, they are sent to the foundry, where the molder displays his skill and brains, and with the patterns as models, a heap of sand and a few crude tools to work with, shapes out his molds from which a set of castings is produced. This set is first machined and finished by the best means available, which calls into use all the capacity and skill of the brass finisher. After all parts have been finished and assembled a complete lubricator is the result. Any defect in shape or strength in the pattern now becomes apparent in the test, which should be by water at about 200 to 300 pounds, pressure. The patterns are then carefully gone over and




TURRET OILING DEVICE, WITH OIL PUMP, PIPING, ETC.

these defects rectified and another set cast. This is also machined and finished and assembled in another lubricator, which is found to be a great improvement over the first.

This model lubricator now goes to the tool designer, who is called upon to scheme up and design complete sets of tools and appliances for the manufacture of the castings in repetition and for the exact duplication of each and every other part, from the body to the smallest fitting. To be able to accomplish all this the designer must first be a practical man familiar with all mechanical principles necessary to the successful construction of the tools, as well as being possessed of a theoretical knowledge of the properties of metals. He must design the tools to be both positive and accurate, as well as strong and durable. He must also allow of their being constructed as simply as possible consistent with accurate production and rapid handling when in operation. Lastly, he must be certain he is right in all measurements. In fact he must construct a perfect set of tools for the exact duplication of all parts of the model lubricator on paper. The designer must also provide for the tools being so constructed as to admit of their being handled to their fullest capacity by men or boys of average skill and intelligence.

The tool designer and the model lubricator now go to the tool maker, who has the last but not the least proposition to tackle. Where the patternmaker had to produce his designs in wood, the draftsman his on paper, and the molder his in sand, the toolmaker has to create his in steel and iron, which can neither be whittled with a knife, nor the parts fastened together with glue, nor the mistakes or inaccuracies rubbed out with an eraser. Unless the toolmaker is a man of brains, skill and experience, all the work of the designer, patternmaker and molder will have been useless. As each tool, fixture, or device is finished it must be tried and proved, and the piece machined in it must fit exactly in its proper position and coincide perfectly with all the other parts, so that the performance of its distinct action is positive; and thus on to the end until the full set of tools is complete, so that a perfect lubricator can be constructed by their use with the certainty that all parts machined in them will be found to interchange perfectly so that they may be selected haphazard in the assembling of a lubricator, or in the repairing of an old one. When all the foregoing has been accomplished the preliminary work necessary to the successful manufacture of this article is assured. We may now go ahead and manufacture by means of the interchangeable system with the aid of gauges.

*(To be continued.)*

## NOTES FROM BIRMINGHAM, ENGLAND.

*(From Our Correspondent.)*

### LARGE MELTING POTS.

An important change has taken place lately in the Birmingham brass foundries in the more general adoption of larger melting pots. Several firms have lately put in the new M. R. B. furnace for melting 440 pounds of metal at a time. The motive is one of economy, the fact having dawned upon the trade that the large pot will dispense with half a dozen small furnaces and also get rid of the mixing furnace used for running brass into ingots. The process is done in one operation instead of two, and all that is necessary after melting is to distribute the molten metal into separate ladles for pouring. Experiment has shown that the fume extractor can be just as effectively fitted to a large pot as a small one.

### INLAID SILVER WORK.

Some attention has been called in jewelry circles to an improving demand for inlaid silver work and artistic japanning, both of which were once great Birmingham arts, but which of late have been rather neglected. At some recent sales the competition has been extremely keen for old specimens of this work, and it is evident that the interest was artistic rather than antiquarian. Years ago Birmingham people paid substantial premiums for their daughters to acquire the art of japanning, and such famous artists as David Cox, Henry Dawson and Moses Houghton passed through the works of Jennens & Bettridge, who were the pioneers of the papier-mache industry. The firm of McCallum & Hodson were for a long time the leaders of the japanning industry. It is noteworthy that the carving and inlaying of gun locks is nothing like as common as it used to be, but some very beautiful specimens are still turned out. Arthur J. Gaskin, the principal of the Jewelers' Art School, has recently suggested the display of a representative selection of specimens of handicraft by old masters at the Birmingham Art Gallery for the use of the students, and it is likely that the suggestion will be adopted. It is believed to be possible to revive the demand for such artistic specialties as inlaid tortoise-shell boxes and trays, papier-mache screens, high-class japanned work generally and damascene work. The enthusiasm shown by many students for this high-class work is most encouraging and it is believed that the craftsmen of the future will be equal to their great predecessors of the past.

## CLAY CRUCIBLES VERSUS BLACK LEAD FOR THE MANUFACTURE OF GERMAN SILVER.

By Thomas Clare.

In Birmingham, England, where I first learned the melting business (1864), we used clay crucibles exclusively for the manufacture of German silver, and on no consideration were we allowed to use black lead crucibles. Undoubtedly the clay crucible is far more preferable than the black lead for making German silver.

You can melt the metal quicker in the black lead, but when pouring off the metal chills too quickly to ensure good work. The clay crucible takes a little longer to melt, but retains the heat twice as long as the black lead, thereby giving ample time to pour off the metal while good and hot, which will ensure good work. If, for instance, the man has to pour six to seven molds, and he is using black lead crucibles, the metal is too cold to ensure good casting by the time he gets the last mold poured, whereas if he is using a clay crucible the metal is hot enough to ensure good, sound casting in the last mold. Another advantage the clay has over the black lead is that you have a new crucible every day, whereas the black lead must be used day after day till it is worn out, and as it gets old the metal chills too quickly.

The same thing applies to making German silver for rolling into sheet and wire (which is poured into iron molds). The clay is preferred to the black lead, especially in making high-grade metal, such as 18, 20 and 25 per cent. If when using a black lead pot you do not get the spelter in just as soon as the nickel and copper are melted, the metal gets too hot and will not accept it and you lose a large percentage, which burns away and spoils the formula. And another thing, if left too long the pot will melt and get into the metal and take the form of sulphur and slag, thus preventing the proper shrinkage taking place, and when rolled down to about 10 to 16 gauge the slag will show up in the form of a scab, which must be treated the same as "spilly" metal; that is, scraped or polished out, which means considerable time and labor, besides adding to the expense of manufacture.

In pouring with the black lead crucible you pour but two skillets with safety, whereas when using the clay you can pour four, enabling you, therefore, to have larger melts. In England they have an entirely different system in the manufacture of German silver to that which is used here in America. First, they melt their nickel and copper in equal parts, which is poured into pigs (this is called miling), then copper and spelter are melted in equal parts and poured in pigs also (this is all melted in black lead crucibles). This does away with the use of raw nickel or spelter, for by taking a certain amount of the miling and pig brass, with the addition of copper, you can make any grade of German silver you wish.

This method and the clay crucible does away with most of the difficulties we meet with in the manufacture of German silver.

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The output of gold from the Transvaal in 1907, according to the London journal *South Africa*, aggregated $133,360,292, against $119,618,507 in 1906 and $61,265,575 in 1903.

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Last year the United States Mint bought 14,776,500 ounces of silver, which was about one-fourth the amount produced in the country. The average price paid was 62.7335 cents per ounce, the highest being 69 and the lowest 55 cents.

## THE AJAX METAL COMPANY'S PATENT INVALID.

In a decision just handed down the United States Circuit Court of Appeals for the Third District reverses the Federal Court for the District of New Jersey in the suit of the Ajax Metal Company against the Brady Brass Company, Daniel N. Brady of New York, president, and finds that the patent upon which infringement was claimed is invalid.

The case has been in the courts since 1903, and was argued on appeal in December last in Philadelphia, for the defendant corporation by Morgan J. O'Brien, before the full bench of the appellate tribunal, which, as stated, has decided in its favor.

This result is regarded as of unusual importance and interest to the entire metal world. Owing to the legal points involved and the important questions disposed of, it is considered as on parity with the noted Goodyear rubber cases and calculated to attract equally widespread attention from men engaged in the metal trade, as well as patent lawyers and all who have occasion to use journal bearings and engine castings.

The Ajax Metal Company set up the claim that it had invented and patented an alloy capable of holding up within itself more load than had been previously possible without the use of nickel, and had thus produced a bearing consisting of less than 7 per cent. of tin and more than 20 per cent. of lead and the balance copper. The validity of the patent was sustained by the trial court, but has just been reversed upon appeal.

The opinion of the appellate court by the circuit judge, the Hon. George Gray of Delaware, in passing upon the claims of the plaintiff, says that "the patent is for a product and not for a process. There is no claim for any particular method of combining the constituents of this alloy, and the specification only states the ordinary foundry practice well known and recognized by those skilled in the art." Discussing the metallurgical features, the court says that points upon which the Ajax Company bases its claim for novelty of invention were all known and well understood by the trade long before the application for patent. The written opinions and the evidence of distinguished experts like Dr. Chas. B. Dudley of the Pennsylvania Railroad, Prof. John W. Langley, a graduate of Harvard, Dr. Chas. F. Chandler and Dr. Jos. W. Richards, who were witnesses in the case, are quoted to confirm the main point that the alloy in question was not patentable, as it "differed in degree and not in kind" from that which had been on the market for a long time. Concerning the Ajax claim that it had discovered a "critical point," so-called, in copper-tin alloys, the Court quotes Dr. Albert Sauvour, a witness for the Ajax Company, to show that the so-called "critical point" was known at least three years prior to the application for the patent in litigation "by all students who have conducted the necessary experiments." Finally the opinion, after a careful and thorough discussion of all the features, says:

"A mere difference in the proportions of the constituents of an alloy, however useful the result may be, does not entitle the originator to the monopoly of a patent, in the absence of other circumstances than those here disclosed. Being of the opinion that the patent in suit is invalid, it is unnecessary to consider other grounds of defense, though we may be permitted to say that the prior public use set up in the answer of the defendant seems to have been sustained by the testimony.

"The decree of the court below is therefore reversed."

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An international exhibition of modern appliances for lighting and heating will be held in St. Petersburg, Russia, beginning December 14 next.

## MANUFACTURE OF ALLOYS.

An invention for which letters patent were issued August 20, 1907, to Walter Ruebel, of Hamburg, Germany, considers a process for manufacturing metallic alloys. The process is characterized by the fact that combinations of atomic quantities of aluminum, copper, nickel and iron are used either alone or as additions to copper and zinc. It is well known that bronzes of great tensile strength can be produced by the addition of a compound of one atom each of copper, aluminum, zinc and silicon to copper, zinc and aluminum or to copper and aluminum. The new compound is manufactured by employing for each two atoms of copper and iron one atom of nickel and aluminum in accordance with the following formula:

$$(CuFe)_2NiAl.$$

In practice the procedure is such that two atomic weights of iron or steel, as low as possible in carbon, are placed at the bottom of the melting pot, whereupon one atomic weight of cube nickel is added. The melting pot is then well covered and brought to a white incandescent heat. When this point has been reached one-tenth of the one atomic weight of aluminum is first of all added, whereupon the iron and nickel which have not necessarily melted before are at once melted.

Thereupon during constant agitation two atomic weights of copper are added in as small pieces as possible and then the rest of the one atomic weight of aluminum. The whole is then mixed together as thoroughly as possible with a stick of carbon and the melting pot is allowed to remain on the fire for another ten minutes, whereupon the metal, after a further agitation, is cast into bars or directly in the desired molds. The alloy thus obtained is claimed to be as hard as nickel steel and presents greater strength. It is not attacked by sea water, water, moist air, or by most acids and is therefore especially well adapted for machine and ship construction, and also for the manufacture of gun barrels.

We quote as follows from the patent specifications:

"A bronze presenting very good properties is obtained if 6 parts of the nickel-aluminum-copper-iron compound obtained in accordance with the above is added to 54 parts of copper and 40 parts of zinc. In the production of this alloy the copper-aluminum-iron-nickel compound is first of all melted and the necessary quantity of copper is added, or the two substances are added, but in this case care must be had that the nickel-aluminum-iron-copper alloy, which is more difficult to fuse than copper and floats upon the same, is really melted, which can be recognized from the fact that the molten mass then appears not of a blue-green, like copper, but white and thick. When a uniform molten mass has been obtained, the necessary quantity of zinc is added and this should be done in small pieces and very carefully, as much heat is thereby generated, as that if a piece of zinc of two kilograms in weight is added, for example, the entire contents of the melting pot would be instantly vaporized. The finished product is, after being well agitated, cast into bars and again melted when it is desired to cast it into molds, and care should be exercised that in remelting the bars they should be very quickly melted down and removed and if this is attended to the loss due to adherence to the melting pot and the like will not exceed 1 per cent at the most.

"The material so obtained costs about 1 mark per kilogram and equals in strength, hardness and resistance the best bronzes hitherto produced. It is therefore suitable for replacing such bronzes."

## IMITATION SILVER DEPOSITS.

By Charles H. Proctor.

Recently there was submitted to the writer two corrugated curtain pole balls, with the request for information regarding the deposit upon them. The inquirers were well known manufacturers of brass and wood curtain poles and trimmings. They stated in their letter they made a similar ball of sheet brass, which was afterward silver plated. The sample ball was made by a competitor of soft sheet steel, upon which the deposit was made direct, and these could be sold at a less cost.

After careful examination the writer formed the opinion that the deposit was an unusual white silver dip, and therefore experimented accordingly. The deposit was reduced from one of the balls, which was recleansed and flashed in a bright brass bath and then whitened by immersion in the silver dip; it was first used by Roseleur. While the method has been somewhat modified from its complication in the original formula, the results are the same and are exceedingly gratifying. Manufacturers of novelty goods in brass, bronze or articles plated from these metals, will find this solution highly satisfactory on account of the beautiful white color with lustre, according to the surface of the article. In the use of the usual cyanide silver dips the color is oftentimes yellowish and after lacquering approaches a greenish yellow.

The modified Roseleur formula is the following:

Dissolve bisulphite of soda in warm water until 22 degrees Baume is reached; then add concentrated solution of nitrate of silver as long as the sulphide of silver formed is absorbed by the solution—probably ½ ounce to the gallon will be sufficient. Then test with blue litmus and the solution will be found to be decidedly acid; add a little concentrated solution of carbonate of soda, until the solution is neutral, or the blue litmus no longer reddens. The bath is then ready for use, but it must be used cold. Iron, steel, tin, zinc, or lead should not come in direct contact with the solution, but should be coppered or brassed previously.

The sample ball was finished by this method and to all appearance was an exact counterpart of the remaining sample. The samples were not lacquered.

To prove if the deposit was the same as the other sample the two were placed in close proximity to sulphuretted hydrogen; after some time the sample with the silver deposit darkened and finally became completely coated with sulphide of silver, while the other sample retained its natural color, proving, as far as the experiment went, that the original sample was not a silver coating.

The writer, realizing that electro-deposits of tin approached silver in whiteness, and oftentimes in light deposits surpassed it in color, and that it could be applied directly to steel and iron, and that lacquering is unnecessary, as tin deposits do not oxidize, coated the sample and submitted it. The firm replied: "It appears to us the electro-tin deposit is what we want and the finish is satisfactory."

The following method was pursued in the final sample:

The ball was recleansed in the usual manner and immersed in the electro-tin bath for one minutes. This formula was used:

| | |
|---|---|
| Potassium bitartrate (cream of tartar) | 4 ozs. |
| Stannous choloride (tin salt) | 1 " |
| Water | 1 gal. |

The solution was prepared by dissolving the cream of tartar in boiling water and then adding the tin salt,

when the solution was ready; the temperature should be at least 160 degrees and a good strong current of at least 4 volts pressure should be used. This formula gives better satisfaction than any of the soda phosphate combinations. A one minute deposit will stand coloring and a three minute one will stand a good hard coloring without cutting through. After the deposit had been finished the article was scratch brushed with a fine steel wire corrugated scratch brush, using a little sal soda in the brush water. This brushing brought up a beautiful white color. The ball was then washed; then immersed in a boiling platers compound solution of 2 ounces to the gallon; then passed through boiling water and dried out in maple sawdust.

To those in search of a cheap, rapid deposit, this method will prove satisfactory, for the very reason that it is not necessary to lacquer the surface as a protection against oxidation.

## TESTING SILVER SOLUTIONS.

By C. S. Barbour, Jr.

A review of The Metal Industry and other trade papers containing a correspondence column reveals a surprising number of inquiries relating to the care of silver plating solutions and troubles pertaining thereto. The data accompanying these shows, in the majority of cases, that the trouble results from too little silver or the wrong quantity of free cyanide. Quite often the inquirer states that he has added chloride of silver to his solution some time previous, and, while it relieved the difficulty for the time being, conditions were soon as bad as ever. The following case will seem to illustrate a frequent cause of this trouble; some time ago, the writer received from one of his clients a sample of silver solution accompanied by a letter stating that they were having considerable trouble and asking for an analysis of the solution and information as to the cause of it. The sample proved to contain 9 ounces of free cyanide of potassium and only ½ ounce of silver to the gallon; this report was sent them with the advice to replenish with silver chloride at the rate of 3½ ounces to the gallon, thus giving a solution of 4 ounces to the gallon. As the amount of free cyanide was not in excess of the requirements for the satisfactory working of the solution, and as the direct addition of the silver salts to the solution would necessarily take up a considerable portion of the free cyanide of potassium in it, they were advised to dissolve the chloride of silver in a crock with cyanide of potassium first. A letter received a few days later stated that the solution was working well. Several weeks later, they again wrote, asking the writer to come to their factory, as the same trouble had occurred again. Arriving there, the plater in charge explained that he had followed instructions implicitly and the results were all that could be expected, but, as he was careful not to overload his tubs and always had his anode surface correspond to his batch, he was positive that the trouble was not lack of silver as in the first case. However, a test of the solution showed less than an ounce to the gallon. The writer then placed his ammeter in the line, hung in a batch of work and set the switch so that the meter registered 15 amperes. The anodes were then removed, upon which the meter showed 10 amperes; this readily proved that there was a leak of current in the tank.

The tank was lead-lined, covered with asphalt; around the edges ran a 2-inch strip of wood on which the rods rested, having a number of nails driven into it to keep the anode rods in place. Calling for a claw-hammer, the writer removed these, and upon removing the third nail, which was in direct contact with the cathode rod, the needle of the meter at once returned to zero, showing that the connection had been broken. This proved that the electric current flowed from the anode rod through the nail into the lead lining.

The solution was then removed from the vat and a space of several square feet was revealed where the asphalt had flaked off, exposing the lead lining, which, acting as an insoluble anode, had exhausted the silver in the solution. Upon being questioned, the plater admitted that the burnishers had complained that the work was coming quite hard, but, as he believed his current was not over-strong (as he had always run his work at the same point of switch), he concluded the fault was in the solution.

Several pieces of work plated during the previous week were then weighed, stripped and then re-weighed, which showed that a much greater amount of silver had been deposited than appeared possible. In one case, a teapot (britannia), calling for 4 pennyweight of silver, had actually received 13½ pennyweights.

As the reader will readily understand, the fact that the meter showed 10 amperes when the silver anodes were removed and only the lead lining acting as an anode, while at the same point of switch the meter showed only 15 amperes with the silver anodes connected, proved that 66⅔ per cent. of the current was being diverted from the silver anodes, so that not only was there three times as much silver being deposited as should have been under normal conditions, but for every ounce of silver taken from the silver anodes, two ounces were being taken from the solution. Had the plater been provided with an ammeter, he would have seen at once that he was getting too much current and would not only have saved the quantity of silver which was wasted, but much time would have been saved in the burnishing department, as there is no disputing the fact that a hard deposit takes much longer to burnish.

### TESTING A SILVER SOLUTION.

Now, just a few simple methods for testing a silver solution. First make 6 ounces of saturated sulphate of copper solution. This is done by dissolving sulphate of copper in water until no more will dissolve. Pour off the liquid in a separate glass; then add slowly aqua ammonia, which will cause a light blue precipitate; keep on adding the ammonia little by little until this is again taken up, leaving a dark blue solution, *i. e.*, ammoniuret of copper; it is unnecessary to add more than enough ammonia to take up the precipitate. Set this aside; now dissolve 1 ounce of cyanide of potassium in 1 pint of cold water (the use of hot water might result in the loss of a little cyanogen gas); shake well. This gives a standard solution representing 8 ounces of cyanide of potassium to the gallon. Now, take a small test tube and with a medicine dropper put 32 drops of the standard cyanide solution therein; then with another medicine dropper, using the ammoniuret of copper solution, count in drop by drop with occasional shaking until the free cyanide has become saturated with the copper, which will be shown by the blue color remaining—16 drops of the copper should be absorbed before reaching this point; if less is required, reduce the ammoniuret of copper with water to bring it to this point.

The reader will see if 16 drops of copper are neutralized

in 32 drops of the above standard solution, by taking 32 drops of any cyanide plating solution. Every 2 drops of the ammoniuret of copper neutralized represents 1 ounce of cyande of potassium in that solution.

While this may at the first glance appear as troublesome as the old nitrate of silver test, in reality it is much easier, as the ammoniuret of copper will keep indefinitely if well corked and a solution can be tested for free cyanide of potassium in two or three minutes with its aid. If, after a considerable time, the copper solution is in part precipitated through loss of ammonia, the precipitate can be re-dissolved by the addition of aqua ammonia.

As to the testing for the amount of silver where the facilities do not permit the taking of a button, the writer has found the following to work very well: Take a metal bowl or shell of copper brass or britannia, clean, dry and weigh carefully and pour into it one pint of the solution to be tested, being sure the solution has been unified by stirring; this bowl will represent the cathode to be plated. Hang in a carbon or platinum anode and deposit the silver on the sides of the vessel; let it run until a piece of stringing wire attached to negative rod shows no silver, when the end is placed in solution; in other words, plate all the silver in the solution on to the bowl; then dry the bowl and weigh it, subtract the first weight from this, and multiply by 8 (the number of pints to the gallon), which will give you the amount of silver to the gallon.

Another method, which, while not accurate, does very well when in a hurry, is to dissolve 10 pennyweight of silver in nitric acid, precipitate with table salt, or muriatic acid, wash several times, then take up with cyanide of potassium and dilute to one pint—this gives a standard solution of 4 ounces of silver to the gallon. Now take as many test tubes as you have solutions to test, say for convenience 4 ounce tubes, mark all at same height, ½ inch from the top, and leave one for the standard solution mentioned above. Now, after well stirring the solutions to be sure they are uniform, fill each tube with a solution and one with the standard solution; then, one at a time, throw down the silver in a suitable jar or pitcher, having diluted the same, with sulphuric acid, this being usually the most convenient. Wash after it settles and return each lot to its test tube with water enough to keep well covered to prevent the precipitate from becoming dry; the sediment, which, if sulphuric acid is to decide their proportionate richness. In 24 hours' time used, is cyanide of silver, will settle down so that each solution can be compared side by side with the standard one can judge and the standard can be kept permanently to compare tests with.

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Stamped goods and enamel ware of every description find large sales in Mexico, and Americans are able to undersell other countries in these lines.

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A Chinese company has recently started the working of tin and silver mines in Hainan. Gold is also to be found, but is in the inaccessible interior and can only be had from the natives at present.

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Swords and other articles made of Chinese coins corded together have been declared by the Board of General Appraisers to be subject to a duty of 45 per cent. ad valorem as articles composed of copper not specially provided for. The importers claim the articles were entitled to free entry as copper coins. It was held that Chinese copper coins were not free of duty as "copper coins" unless imported as currency.

## THE DEPOSITION OF BRIGHT COPPER.

By Royal F. Clark.

In writing this article the writer does not intend to present anything new, as bright cyanide copper solutions have been in use for some time. But, believing the plating fraternity will appreciate a "bright copper," I will herein describe one which has given me entire satisfaction.

Cyanide copper solution may be brightened by the addition of hyposulphite or bisulphite of soda, but it will not render the deposit bright for any length of time, as in a short while it becomes dull, yet uniform. Hence, scratch-brushing, dipping, or buffing must be resorted to in order to produce a lustrous surface. This bright copper deposit, which need not be subjected to the above operations, comes out of the bath in a very bright condition. The article may be "struck" in a brass solution, then "gold flashed" or "gold dyed" or oxidized, as the case may be. For oxidized copper finishes the deposit is excellent, as it continues to be oxidized "bright," thus dispensing with scratch brushing.

The brightener which I have been accustomed to use is made as follows:

Dissolve 24 ounces of commercial caustic soda in 2 gallons of hot water, adding the soda slowly with constant stirring. A 5-gallon crock makes a suitable vessel in which to prepare the brightener. In a small quantity of warm water mix 8 ounces of carbonate of lead and add this to the soda solution and stir thoroughly. Allow to settle, then pour off the clear solution which is the brightening agent. It will stand between 20 and 25 Baume. As it is a very strong solution, a very small quantity should be added to the bath at one time.

To brighten any cyanide copper solution add a few ounces of the brightener to the solution, with stirring, while a piece of work is in the bath. When the deposit becomes bright, enough has been added. Adding too much of the lead solution produces a dull leaden color. From 4 to 4½ volts is the proper voltage for the production of a very bright deposit. When the deposit becomes dull in spots a small quantity of caustic soda dissolved in water, also a small quantity of cyanide of potassium, are added to the bath at the same time, in order to "bring up" the copper and the lead. It will take about 8 ounces of the brightener to brighten 75 gallons of copper solution.

Caustic soda in sticks, lime, or alcohol rendered will answer just as well as the commercial. The bright copper can be used in connection with tumbling barrel work.

Heating the solution is unnecessary, but if the temperature of the bath is kept between 100 and 125 degrees F., the deposit covers better and the conductivity of the solution is increased. The writer has used the solution on certain classes of work at a temperature as high as 200 degrees F., with good results. The bath should stand 12 Baume.

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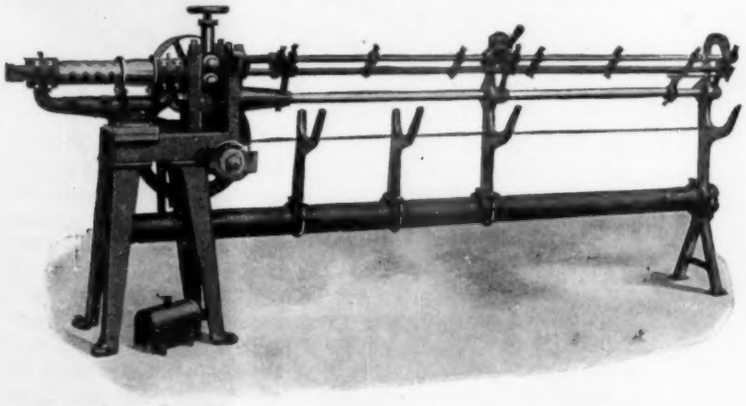
The latest resources of southeastern Manchuria are minerals which are believed to be valuable and may in time become the most important output of the region, says a recent consular report from Mukden. Gold, either quartz or placer, has been found here and there throughout the whole territory; silver is present principally in the vicinity of Fenghuangcheng, Tsaohokou and Saimachi; and valuable copper deposits have been discovered near Tunghuashsien and Maoerhshan. There is plenty of coal in the region for the fuel necessary for the operation of the smelters which may in the near future be established in connection with gold, silver and copper mines.

# INDUSTRIAL

NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

## AUTOMATIC WIRE STRAIGHTENING AND CUTTING MACHINE.

The machine here illustrated, designed and built by the F. B. Shuster Company, of New Haven, Conn., is intended to automatically straighten and cut wire into long lengths. It can also be used for cutting shorter lengths than the capacity of the machine, but the manufacturers do not recommend its continuous use for cutting short pieces. In this machine a shaft, about as long as the machine is intended to cut, is attached to the fulcrum of the cutting off lever and rotates with each movement of the lever. The guide bar, situated above and forward of this shaft, is connected with both the shaft and cutting off lever and has a groove running its entire length, in which is located a movable adjustable gauge; this gauge is connected at its outer end by a wire to a clutch on the cam shaft. When the straightened wire strikes this gauge, as it passes through the groove from the bushing die, it throws in the clutch, and the cutting off lever works insantly; at the same time the rotary motion of the shaft throws the cover off the groove in the guide bar, by means of arms attached to it, and the cut wire drops out. Forked holders attached to a piece of wrought iron pipe extend upward and support the shaft, guide bar and other necessary parts, thereby forming a rigid extension.



AUTOMATIC WIRE STRAIGHTENING AND CUTTING MACHINE.

The machine embodies many important improvements; the parts are made interchangeable and the arbor brackets detachable from the body of the machine, thus securing continuous running of the machine with the use of an extra arbor while the rebabbitting of an arbor is taking place. The arbor is provided with a detachable cover and with flanges on the side of the pulley, which revolve in pockets containing waste which is renewed from time to time, thus preventing the oil, grit and scale from working into the driving belts.

---

According to a recent consular report the exports from the districts of Geneva, Berne and Basel consisted chiefly, in former times, of complete watches, but now the greater part is composed of watch parts for use in American factories. The report says: "This industry is, in point of workmanship, of the perfection of its tools and methods of manufacture, of its wise division of labor and specialization, most up to date, and is, as regards fine movements, unrivaled."

## NEW HEAT GAUGE OR ELECTRIC PYROMETER.

We illustrate herewith a new heat gauge or electric pyrometer which is the outcome of some years spent in research work, in high melting point alloys that were also sufficiently high in electromotive force, to produce a thermo couple that could be used with the more robust portable millivolt meter instead of the usual delicate galvanometer.

On account of the large diameter of the wires and the metals of which it is made this thermo couple or hot end needs no protecting tube, thus doing away with use of expensive and fragile porcelain tubes. The usual practice of putting the thermo couple or hot end in a thick walled porcelain quartz tube makes the temperature as indicated at the pyrometer lag so much behind the temperature of the molten metal measured, that such a hot end is of little use, especially in taking the temperature of molten aluminum, which must be poured at as low a heat as is possible.

NEW HEAT GAUGE OR ELECTRIC PYROMETER.

The Hoskins thermo couple or hot end responds quickly and indicates without lag the temperature of the material measured.

It is not affected by furnace gases and does not alloy with the non-ferrous metals such as aluminum and its alloys, brass, zinc, copper, lead, etc. These properties make it safe to use in the foundry, and will enable the founder to repent with certainty the pouring temperatures that have been found to be best for strength and to make sound castings. In the machine shop it is usual for each tool maker to harden his own work, and because he is called on to do this only when each job is finished he has to depend on his judgment for the proper temperature and try and remember how hot he heated the last job.

The use of a heat gauge eliminates all this guesswork and saves many times its cost in a very short time.

The Hoskins thermo couple or hot end is stated to have more than four times the electromotive force of the platinum-rhodium couple, giving 40 millivolts at 1,000 C. as against 9 millivolts for the platinum-rhodium couple.

Special scales are made for intermediate temperatures, the standard instruments are furnished with the Fahren-

heit or Centigrade scales, reading from 400 F. to 2,550 F. or 200 C. to 1,400 C. The Hoskins Company, 93 Erie street, Chicago, will send a catalogue showing the Bureau of Standards tests with complete information.

### NEW WESTON AMMETERS AND VOLTMETERS.

The Weston Electrical Instrument Company, Newark, N. J., have perfected two new lines of instruments intended for use as ammeters and voltmeters or direct current switchboards. We here illustrate the ammeter. They are of the soft iron or electro-magnetic type, but in their

NEW WESTON AMMETERS AND VOLTMETERS.

electrical and mechanical characteristics are far in advance of preceding forms of soft-iron instruments. To avoid confusion with the Weston permanent magnet switchboard instruments the new lines have been designated with the distinguishing title Eclipse Voltmeters and Eclipse Ammeters. In the accuracy of their indications under all the widely varying conditions of practical use they very closely approach the permanent magnet instruments. The same may be said of their sensitiveness and their deadbeat qualities, in both of which aspects they come very near the Weston permanent magnet type of instrument.

### RECENT TESTS OF "MONEL METAL."

THE METAL INDUSTRY has published several times descriptions of "Monel Metal" as the manufacturers of this product, the Orford Copper Company, 43 Exchange place, New York, have announced the progress they were making with this alloy. The company now report that they have been successful in making arrangements for sound castings in "Monel Metal," and believe that they are now in a position to put "Monel" in active competition with Manganese Bronze. They are already filling orders for propeller wheels, valve stems, nails, wire, screws, rivets, household boilers, cooking utensils, spoons, bathroom fittings and ship fittings and are receiving many inquiries for these various products. It will be seen from the above list that the metal has a wide range of application.

"Monel Metal" itself is a natural alloy containing from 70 to 80 per cent. nickel, the balance copper. The following is a recent physical test made by the manufacturers:

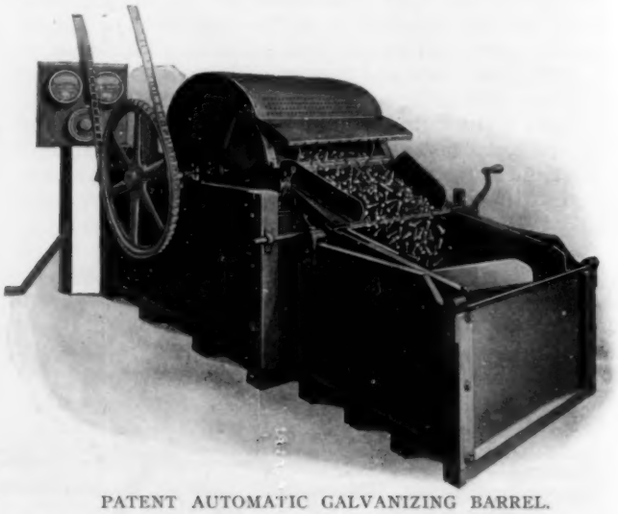
| | *Grade "B"* | *Grade "C"* | *Grade "C L"* |
|---|---|---|---|
| Tensile strength.... | 85,000 lbs. | 65,000 lbs. | 83,750 lbs. |
| Elastic limit ..... | 40,000 lbs. | 25,000 lbs. | 29,000 lbs. |
| Elongation in 2".... | 10 % | 30 % | 45 % |
| Reduction of area... | 14 % | 35 % | 44.6 % |

"'Monel Metal' castings are sound, clean and true to pattern, easily machined, and the high percentage of nickel used insures great strength and toughness."

### PATENT AUTOMATIC GALVANIZING BARREL.

The automatic galvanizing barrel, the patent right to use which is controlled by the United States Galvanizing Company, of 1 Park avenue, Brooklyn, N. Y., is as its name implies, an automatic device for galvanizing articles. It is so constructed that the shafting bearings, working parts, etc., are not immersed in the galvanizing solution, and in consequence these parts are not coated.

After pickling and cleaning, the galvanizing barrel



PATENT AUTOMATIC GALVANIZING BARREL.

is filled by means of pails, shovels, or the like, with from 150 to 200 pounds of material and is then started to turn slowly in one direction and in about 30 to 40 minutes the work is finished. Upon reversing the motion of the barrel it empties the galvanized material, this taking from three to four minutes, into a water tank which contains a chute, and while therein the material is washed free of the remaining solution. The chute is then lifted half way in order to raise its contents out of the water. The material remains in this position about 10 minutes to drain and dry, and is then completely finished, ready to be packed in boxes, kegs, or receptacles used for receiving the finished material.

The thickness of the coating can be regulated to meet the requirements and depends upon the length of time the material is allowed to remain in the barrel. The coating deposited consists of chemically pure zinc and is uniformly smooth and even over the entire surface. In appearance the coating is bright. It is very evident this method has no effect whatever upon the temper or nature of the metal galvanized. Each barrel will handle from 1,500 to 2,500 pounds per day, depending upon the weight and nature of the material to be galvanized.

Phosphorus does not occur in copper ingots, but if scrap copper tubes or rods are used which have been cast in pots it is usually present in quantity up to 0.07%. It makes gun metal rather hard for turning.

In the composition of brass baths there is very little change from the formulas prescribed by the great master Roseleur, whose directions stand pre-eminently above others in their successful working. This applies not only to brass solutions, but to nearly all metals that are employed in the art of electro deposition.

## KEEPING THE TONGS IN SHAPE.

By Dudley A. Johnson.

In our October issue of *Graphite* we called attention to the imperative necessity of having the tongs right and fitting properly when *new*, in order to prolong the life of the crucible. Tongs remain in shape only a short time, even with the most careful handling. They get red hot at frequent intervals and warp and work out of shape, so that tongs that were perfect last month may be sadly needing attention now.

What is to be done? The tongs must be sent out to the blacksmith and a crucible sent along on which to fit them. There is the expense of cartage both ways, the blacksmith's bill and the loss of time, and like as not they

IRON CRUCIBLE USED AS AN ANVIL.

are poorly fitted and not much better when they come back than when they were sent out. The crucible is more or less damaged by the transportation and handling, and all in all we find that many prefer to get along and take a chance with the old tongs until at last the pots begin to go to pieces in half the usual time and a big jump in the crucible cost forces immediate attention to the matter.

Why not be your own blacksmith and mend your own tongs without ever having to send them out of the shop?

We submit herewith a picture of an iron crucible, which is intended to be used as an anvil. From the bilge, or widest part, down it is identical in shape with the graphite crucible; from the bilge upward it is made enough larger than the crucible so that, when the tongs are perfectly fitted to the iron pot, there will be sufficient space so there is no possible chance of squeezing when placed on the graphite crucible. The bottom of this iron pot has been cut off to reduce the weight, but it is long enough to accommodate the full length of the tongs.

These iron pots are made to match the various sizes of crucibles, ad the one in the picture is a No. 50. One will last for a lifetime, and each foundry should be equipped with an iron crucible corresponding with the sizes of graphite crucibles in use. It then only becomes necessary to put the tongs in the furnace, heat them red hot, clamp them on the iron pot just the same as they would be clamped on to a graphite crucible, and with a sledge hammer they can be made to fit perfectly in an incredibly short space of time.

It is next to impossible for a blacksmith to shape a pair of tongs on an anvil so that they perfectly fit the crucible. He must place them on the pot, examine carefully all over, then hammer where he thinks it is needed, place them back on the pot again, and, after innumerable trials of this sort he gets what he considers a sufficiently good fit and lets it go at that. It will be apparent to the casual observer that this iron anvil, which is just the proper shape, is sure to bring the right results if the tongs are hammered down until they touch at every point.

Inasmuch as there is a considerable outlay involved in

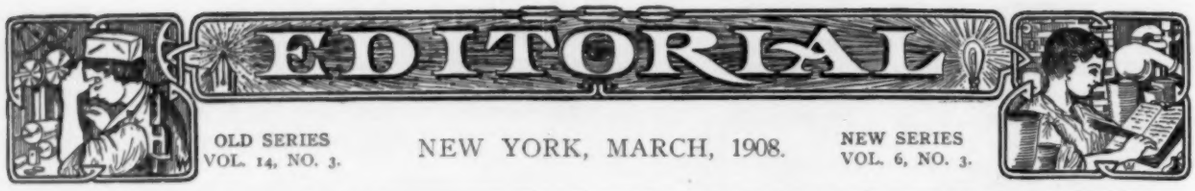
THE APPLICATION.

getting the patterns ready for an iron crucible of this sort, and as the foundry-man only needs one of each pattern, we have arranged with E. R. Klemm, 103 W. Monroe street, Chicago, and he has had patterns made for the standard sizes of Dixon's crucibles and is ready to fill orders immediately upon their receipt. * * *

We trust our suggestion will prove of benefit to our friends in the brass trade.—*Graphite.*

---

Last year British Columbia produced 233,000 ounces of gold, 3,000,000 ounces of silver, 54,000,000 pounds of lead and 39,000,000 pounds of copper. The total metalliferous production was valued at $16,525,920, a decrease of $1,906,582, while the total non-metalliferous aggregated $8,810,000, an increase of $2,261,956, showing a net increase in value of production for the last year of only $355,374.

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# THE METAL INDUSTRY

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### A FAR-REACHING ALLOY PATENT DECISION.

A decision in which many of our readers will be interested has just been rendered by the United States Circuit Court of Appeals for the Third District in the suit of the Ajax Metal Company against the Brady Brass Company, Daniel H. Brady of New York City, president. The decision reverses that of the Federal Court for the District of New Jersey, and declares the patent upon which infringement was claimed to be invalid.

The claim was set up by the Ajax Metal Company that it had invented and patented, March 7, 1900, an alloy capable of holding up within itself more lead than had previously been possible without the use of nickel. Further, it had been able to produce a bearing metal containing less than 7 per cent. of tin and more than 20 per cent. of lead and the balance copper. The validity of this claim was upheld by the Federal Court, but pronounced invalid by the Circuit Court of Appeals.

The decision by Judge George Gray reviews the evidence very clearly and brings out the crucial points upon which the opinion was founded. Regarding the part played by the tin the decision says: "It would appear also from the discussions of the experts that the copper alone, while giving strength and toughness, has not sufficient hardness, and this hardness is increased by the amalgamation with it of small quantities of tin. Whatever may be the true metallurgical function of the tin in this alloy, it had been recognized long before the date of the patent in suit that a proportion of tin relatively smaller than that of the copper, or even the lead, was necessary to the efficiency of the product. Lead being the more plastic constituent and forming, so to speak, the lubricant in the alloy, the problem presented in the prior art was to produce the alloy with a maximum of lead. * * * To obtain as much as possible of the desirable lead constituent in the alloy, it was necessary to reduce the tin." In emphasizing this action the decision states: "These matters were all understood in the trade long before the application for the patent in suit, and efforts were being made to solve the problem."

In an article published by Dr. Charles B. Dudley, the distinguished metallurgist and chemist of the Pennsylvania Railroad, in the *Journal of the Franklin Institute* in February and March, 1892, he said: "The value of lead in a copper-tin alloy for bearing metal being apparently so well established, it became a question of how much lead could be gotten into the alloy without running into difficulty." Upon this evidence the Judge says: "As he is here speaking of the art prior to 1892, we may remark in passing that there can, of course, be no claim for discovery of the adaptability of the copper-tin-lead alloy for use as a bearing metal at the date of the application for the pat-

ent in the suit, to wit, March 7th, 1900." Further on Dr. Dudley gave the composition of a bearing metal containing the following:

| | |
|---|---|
| Copper | 77.00 |
| Tin | 8.00 |
| Lead | 15.00 |

Of this alloy it was stated that both in regard to heating and in regard to loss of metal by wear, "no other bearing metal that we have experimented with gives as good results." The opinion is expressed that "It is not at all certain, however, that a still further modification in the diminution of tin and increase of lead would not give even better results."

Professor John W. Langley said that "The above shows a progressive increase in the lead, and a partial uniformity in the decrease in the tin, both changes being progressive proximations toward the composition of copper 73, tin 7, and lead 20, which is that of the patent in suit, and would show that this latter is a mere change in proportions toward which the state of the art was already drifting, and therefore did not involve an act of invention, or introduce any changes other than those already in progress in the normal development of the art."

It is pointed out that the alloy of the patent differs from others, and notably from that of Dr. Dudley, only in degree.

Dr. Joseph W. Richards testified that: "As far as I know myself and can learn from the testimony of others who have used these metals for bearings, the metal made with less than 7 per cent. of tin and over 20 per cent. lead is, when well made, superior in anti-friction quality to the Exhibit B metal (Dudley's), which contains 8 per cent. of tin and 15 per cent. of lead; but the difference is one of gradual improvement. As the tin decreases and the lead increases a better anti-friction metal is obtained without being any break of change per saltum in the anti-friction qualities of the alloy. It is a question of gradual reduction of the tin, gradual increase of the lead, giving gradually a better alloy with probably some increased difficulty in obtaining the alloy homogeneous."

We now reach what we think the most important part of the decision. The Judge says: "A mere difference in the proportions of the constituents of an alloy, however useful the result may be, does not entitle the originator to the monopoly of a patent, in the absence of other circumstances than those here disclosed." According to this, mere difference in proportion, no matter what the result may be, plays no part in the protection by patent scheme. The importance of this remark rests upon the influence it may have in the future upon patents of alloys, and it is very possible that its working may be felt in the case of certain well-known alloy patents now in force, particularly to some belonging to what we may term the bronze group.

We may illustrate our meaning in the following manner. Vanadium may prove to be of the greatest advantage in certain copper alloys. If it were ascertained that an exact percentage added to a bronze produced a metal possessing very superior characteristics, would or would not that be a proper subject for a patent, and, in the face of the above decision, would such a patent be valid? Again, are composition patents now in force any protection, and would they probably be declared invalid if taken to court? Even with this decision on the books we do not believe the discoverer of a valuable alloy would hesitate to seek the protection of the Patent Office.

---

### A BRITISH COPPER AND BRASS INSTITUTE PROPOSED.

A letter which appeared in *Engineering* of London on January 24 last dwelt upon the great need felt by the copper and brass industries of Great Britain for an association founded upon lines similar to those of the great engineering societies and particularly of the Iron and Steel Institute. The practical benefits to be derived from such a society, financial, social and especially educational, were brought out strongly. The idea was received most favorably throughout the country and was most heartily endorsed in the trade centers. The culmination came on February 13, when a meeting of copper and brass manufacturers, engineers and others, was held in Manchester. It was then unanimously resolved by those present to form a Copper and Brass Institute.

The objects of the Association were defined as follows: To afford a means of communication between members of the trades in question bearing upon their respective manufactures and excluding all questions connected with wages and trade regulation. It was further decided to arrange periodical meetings for the purpose of discussing practical and scientific subjects relating to the manufacture, working up and use of the non-ferrous metals.

It is not the intention of the founders to limit the Society to the copper and brass trades, but to include all those in any way connected with the commercially important non-ferrous metals and their alloys, such as lead, zinc, tin, aluminum, nickel, gold, silver, platinum, etc., and their alloys. A call for a further meeting on March 10, the result of which has not yet reached us, was signed by William H. Johnson, of Richard Johnson, Clapham & Morris, of Manchester; H. C. H. Carpenter, Professor of Metallurgy, The University, Manchester, and G. G. Poppleton, representing the Wholesale Traders' Association for the hardware and metal industries of Birmingham.

The Iron and Steel Institute, which the new Association plans to emulate, has, by its meetings in Europe and America, and its papers and publications, promoted the diffusion of knowledge, hastened the adoption of new processes, and stimulated scientific research into the properties of iron and steel. Working in a parallel direction, the Copper and Brass Institute hopes to be of like benefit to mankind. We extend to the new Association our heartiest best wishes for its prosperity and success along the lines it has mapped out.

Our own Brass Association will celebrate the first anniversary of its birth next June, so that it only has an advantage of some nine months over our friend across the water. We shall watch with interest the progress of the two societies, and duly chronicle the proceedings of each. May they both be powerful factors in the education of those engaged in, and those to be engaged in, the industries handling the non-ferrous metals.

CRITICISM AND COMMENT
WE CORDIALLY INVITE READERS' OPINIONS AND CRITICISMS OF ALL ARTICLES
PUBLISHED IN THE METAL INDUSTRY. SUGGESTIONS WELCOME.

### THE STAMPING ACT.

To the Editor of THE METAL INDUSTRY:

Your editorial in the February issue on the new stamping act is correct. Until they place the manufacture and stamping of precious metals on practically a hall marking basis the fake business can never be done away with; although I am afraid, as the *Jewelers' Circular* says in reply to your article, in the January number, that such an institution could never be established in this country. However, it is encouraging to have people's eyes opened to these useless bills that are rushed through.

A. F. SAUNDERS.

East Syracuse, N. Y., February 21, 1908.

### VAPOR GALVANIZING, SHERARDIZING AND COWPERIZING.

To the Editor of THE METAL INDUSTRY:

My attention has been drawn to an article in the January number of your paper entitled "Vapor Galvanizing," which appears under the name of Alfred Sang.

I am the inventor of two processes of vapor galvanizing known as Sherardizing and Cowperizing. Mr. Sang's remarks upon that process and the description of a method of procedure claimed by him as novel have considerable interest for me.

In the article referred to the author gives me the honor of a brief mention in the following words: "Last year Cowper-Coles secured a patent on a process for ornamenting or coating metals by means of vapor and by using hydrogen and borax. His patent is hedged in by the limitations which necessarily arose from the ghost of the late Mr. Chambyron's invention."

On reference to my patent of 1906, referred to by Mr. Sang, I find no mention of borax, and its perusal leads me to the conviction that it covers the process of coating metallic surfaces by means of vapor of zinc or any other volatilizable metal, the process being known and publicly referred to for some time past as "Cowperizing."

The ghost of the late Mr. Chambyron's invention rests undisturbed by my invention.

I offer my congratulations to Mr. Sang for his researches into the nature and properties of zinc duct, and shall heartily welcome his contribution to the information already available on this interesting substance.

I have endeavored to repeat the experiment described in some detail in the article by Mr. Sang and have rung the changes in the modification of conditions allowed by the terms of the description, but have failed, however, to obtain any adherent coating of zinc, silvery or otherwise.

The chief features in Mr. Sang's *modus operandi* consist in the low temperature of the object to be coated and the use of an oil film upon the object, but these two features are not novel, as will be seen by a reference to the Sherardizing patent, which discloses a low temperature and specially mentions the effect of a film of oil on the articles treated. In the low temperature Mr. Sang works at zinc is merely condensed upon the object as on any other inert body and, oil or no oil, has no tendency to alloy with copper, far less with iron.

If, on the other hand, the temperature be raised until the Cowperizing point is reached (indicated by incipient "brassing" on copper objects) no oil could remain on the metal, since "within a few minutes" it would evaporate off.

Mr. Sang makes light of the difficulty experienced from the presence of air and consequent formation of oxide of zinc. The use of hydrogen is in my patent partly dictated by this very consideration, which is of great importance in practice.

On November 6, 1905, I read a paper before the Society of Engineers entitled "The Metallic Preservation and Ornamentation of Iron and Steel Surfaces," fully describing the process of Sherardizing and electro-galvanizing. It is now out of print, otherwise I would send you a copy. I am sending you a copy of a paper I read before the British Association, August, 1906, fully describing the process of Sherardizing.

SHERARD COWPER-COLES.

London, Eng., February 22, 1908.

### "GOOSE" TIN.

To the Editor of THE METAL INDUSTRY:

What do you mean by "goose" tin, page 66 of your February issue? We have heard of every other kind of tin except goose tin. MERCHANT & EVANS CO.

February 21, 1908. Philadelphia, Pa.

There are various grades of tin on the market that are cheaper than Straits tin. Bolivian tin is one of these, but it only contains 93 per cent. of tin and is not suited for most of the uses to which tin is put. "Goose" tin is, however, much more highly refined. There are two grades of it: "Goose Extra A" and "Goose." "Goose Extra A" runs about as follows: Tin, 99.08; antimony, 0.35; copper, 0.04, and lead, 0.53. It is sold at a concession of ⅝ to ¾ cent a pound below the price of Straits tin. "Goose" tin contains: Tin, 98.02; antimony, 1.18; copper, 0.03, and lead, 0.77. This sells at 1¼ cents below Straits. These grades of tin are suitable for making lead-covered cable, brass castings and even A-1 babbitt as the fraction of a per cent. of lead that the tin contains will make the babbitt stronger, tougher and harder than Straits tin. J. L. J.

### NEW BOOKS.

Handbook on Electro-Plating, Polishing, Lacquering, Burnishing and Enamelling. Fully illustrated, 6½ x 9¾ inches, 152 pages. Published by W. Canning & Company, Birmingham, England.

This is the third edition of this work and since the last edition appeared several great improvements have been made in electro-deposition; these are all dealt with in very complete manner. It is stated that the aim throughout has been to set forth in detail the practical means which at present are adopted in this country (England) for the electro-deposition of various metals, and the preparation and finishing of the same. The books carries out this aim in most excellent fashion. No attempt is made to introduce scientific detail or to discuss the chemical aspect of electrolysis; but the object has been to provide a handy book of reference and to furnish recipes for the making of fresh solutions and to furnish hints for putting troublesome solutions right. While the book is, to a certain extent, a catalogue of the publishers, it contains a great amount of information of value to the plater.

# CORRESPONDENCE

IN THIS DEPARTMENT WE WILL ANSWER QUESTIONS RELATING TO THE NON-FERROUS METALS AND ALLOYS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

## METALLURGICAL.

Q.—We have an order for some bronze pump castings like the sketch. We had poor luck with the first lot cast as they were full of blow holes for at least half the length on the open end. The metal is as follows: 86 copper, 6 tin, 6 lead, 1 antimony and 1 New Era Manufacturing Company's metallic phosphor, this last being a phosphor-tin supposed to contain a larger percentage of phosphorus than the ordinary phosphor tin. The castings were about 80 per cent. new metal, the rest being gates, risers, etc., from the same composition. They were poured with the open end up, the pouring gate running to the bottom.

A.—With the small amount of lead that your mixture carries it is not necessary to use the antimony to hold it in. The phosphor is also of little value, as it is composed of antimony, lead, tin and a very little phosphorus. The antimony has a tendency to produce blow holes, so would advise the following mixture: Copper, 88; lead, 6; 5 per cent. phosphor-tin, 6. The mixture you used should have a shrinkage of about 9/64 inch to the foot, hence your increased thickness of ⅞ to 1⅛ must have been due to your molder's shaving off the core so as to bring the thickness of the sides up to that of the closed end. Would advise the mixture mentioned above and that the casting be molded closed end up with four large risers, one in each corner of the flask and a fifth riser on the closed end of the casting. Bottom pour, using a skim gate.—J. L. J.

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Q.—Kindly give us information in regard to the mixture and method of manufacture of phosphor copper. Any data you may have pertaining to this subject will be appreciated.

A.—The ordinary phosphor copper found on the market contains 95 parts of copper and 5 parts of phosphorus. It may be made by melting copper at a low heat in the crucible or Schwartz furnace and adding the required amount of phosphorus by means of a phosphorizer. A special grade of phosphor copper that contains 15 per cent. phosphorus is made abroad and imported in considerable quantities. J. L. J.

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Q.—I have some oxide of lead which I wish to reduce. The oxide was formed from lead used in a storage battery and was dipped in sulphuric acid and dried before using the same. I have melted some in a crucible, but it attacked the same and destroyed it in two melts. It also destroyed a wrought iron ladle in one melt. How can I reduce the same in an ordinary brass furnace?

A.—Storage battery grids may be considered to consist of metallic lead, lead oxide and lead sulphate. They are usually made from antimonial lead. A trial lot run down in an ordinary cast iron babbitt kettle with charcoal cover gave 43 per cent. metal which contained:

| | |
|---|---|
| Lead | 92.50 |
| Antimony | 4.75 |
| Tin | 2.75 |

The residue consisted of lead oxide, lead sulphate, etc. This can best be handled in a lead blast furnace by the lead smelters. This material cannot be run down in a graphite crucible because the lead oxide unites with the silica sand of the crucible, forming lead silicate slag. —J. L. J.

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Q.—Would you kindly advise us what is the best way to refine lead sediment, such as comes from lead storage batteries, in which there appears to be more or less sulphuric acid mixed with it?

A.—If you have much of this material it might pay to work up a process for treating it. The sulphuric acid could be removed by boiling with water and decanting. The acid could then be concentrated or be used for dissolving the copper or nickel out of residues containing them. The lead oxide and lead sulphate remaining could be smelted to metal in a shaft furnace or reverberatory furnace, or possibly could be ground with a small amount of whiting to neutralize any trace of acid remaining and used as a paint.—J. L. J.

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Q.—I would like information on mixtures for babbitt metal and metal packing rings.

A.—Brass Founders' Alloys, by J. F. Buchanan, which we can send you for $2.00, contains much valuable information on babbitts. You will find the U. S. metallic packing, which consists of lead 83⅓ parts, tin 8⅓ parts and antimony 8⅓ parts, an excellent packing ring mixture.—J. L. J.

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Q.—We want a suitable alloy for backing up a copper mold about ⅛ inch in thickness and which can be put on by covering the back of the copper with a sheet of foil solder and pouring the alloy on it, afterward machining. This alloy would have to stand a temperature of about 800 degrees at least, and we would prefer something which would melt it at about this point so that it would not require excessive heating to melt. We have been using zinc for the purpose, but the extreme expansion of zinc has a tendency to contract the copper by pulling it with it after being successively cooled and reheated. Zinc is also very brittle and does not stand up well under pressure. The alloy should be one with a minimum amount of contraction and expansion.

A.—The co-efficient of expansion of copper is 0.0000167 and that of zinc 0.0000291. If the mold could be made of Parson's manganese bronze (cast or drop forged), and the backing of Parson's white brass No. 2, double, you would have two alloys closer to each other in expansion. The melting point of the last named alloy is about that of zinc, while both alloys contain a large proportion of zinc. An alloy of lead 95, antimony 5, has about as little shrinkage as any common alloy, but it melts under 600 F. Zinc dross has been used for backing molds. Both zinc dross and Parson's white brass become plastic before melting and could be shaped with a trowel at the proper heat.—J. L. J.

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Q.—Occasionally I have trouble with my yellow brass castings, which you can see by the sample I am sending. There are black spots after it is dipped. The copper we use is all scrap wire. To every pot I use 2 small handfuls of salt during the heat; one handful when I put the

crucible in the furnace, and the other after the copper is melted down. At all times I keep about 2 inches of tanned bark on top of the metal. The mixture I use is as follows: Copper, 1 pound; zinc, 8 ounces, and lead, ½ ounce. I am particular that the metal is well stirred before pouring, so as to be sure of thorough mixing.

A.—We would advise that the lead in the mixture be replaced by an equal amount of tin. Lead is not a desirable thing in a dipping metal and if you have a small amount of aluminum in your mixture lead is even less desirable, because lead and aluminum do not alloy well with each other. The sample casting sent is a very good one. There are two small shrinkage spots over the lettering which could be avoided by different gating, and several small discolored areas due to the pickling acid not being fully washed off, but these spots are superficial and can be removed by the scratch brush; but otherwise it is a very fine casting.—J. L. J.

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Q.—(1) What percentage of metals go to make up Muntz metal; also (2) what amount of Elephant phosphor bronze must be used with a given amount of copper to make a good phosphor bronze?

A.—(1) Muntz metal is not a casting metal, but is intended for forging or rolling. It consists of copper 60 pounds and zinc 40 pounds. (2) Many brass founders think it necessary to have ¾ to 1 per cent. of phosphorus in their phosphor bronze, to secure complete deoxidation. Others think it best to have only a trace present. If "S. Elephant" phosphor bronze is meant it should be reduced with a mixture of copper 80, tin 10 and lead 10, instead of copper alone. It would probably not be advisable to use more than 100 pounds of this mixture to each 100 pounds of the Elephant phosphor bronze.—J. L. J.

## MECHANICAL.

Q.—What is a good lubricant for turning and threading copper?

A.—There are numerous compounds on the market used as a lubricant for cutting different metals that may serve the questioner, but it has been my past experience that the most of these are a detriment to the machine. Therefore lard oil is the best and if this seems too expensive use milk and you will obtain good results.—E. W.

## CHEMICAL.

Q.—(1) We nickel plate a large amount of cold rolled steel. We do not copper this. I would like a dope to cover them—one that is easy to remove and that will prevent rusting. (2) We also have some sheet zinc nickeled on one side. We wish to protect the other side.

A.—(1) To prevent tarnishing or rusting of nickel plated cold rolled steel, dry out with the aid of a boiling solution of plater's compound, 2 to 3 ounces to the gallon. Use this instead of boiling water. A thin film of grease deposited upon the surface makes them easier to dry out and protects them from the air. (2) For a stop-off when plating sheets use air drying japan thinned with benzole. Apply with a camel hair brush. This dries quickly and is easily removed with gasoline.—C. P.

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Q.—(1) I would like to know how to make a cyanide steel electroplating bath and also (2) a formula for a tin solution.

A.—(1) You will be unable to get satisfactory results from a cyanide steel solution if you desire it for antique work or gun metal finish. Prepare a solution as follows: 8 ounces double sulphate of nickel and ammonia is dissolved in 1 gallon of warm water. Now add water ammonia until a bluish tone is produced instead of green; then add 1 ounce of bisulphite of soda. Now prepare a concentrated solution of cyanide of potassium in boiling water and then add all the powdered white arsenic it will dissolve; after cooling, the solution will become black. Add a little cyanide to your nickel solution, or until it becomes the color of dark vinegar; then add 2 or 3 ounces of the cyanide of arsenic solution. Use the same as a nickel solution, only sheet brass anodes should be used instead of nickel. A good black deposit can be obtained. To maintain the solution in condition add a little cyanide of arsenic when the deposit is not black enough, and a little nickel solution occasionally. (2) For a tin solution dissolve 4 ounces phosphate of soda and 1 ounce chloride of tin in each gallon of water; use anodes of pure tin and a weak current.—C. P.

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Q.—Kindly publish a solution for extracting copper from brass siftings under the electrolytic process.

A.—We know of no solution by means of which copper can be extracted profitably from brass siftings by the electrolytic process. The siftings should be freed from iron with a magnetic machine, and then melted in a crucible containing some previously melted brass in the bottom.—A. M. F.

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Q.—We are sending you two blades of shears. You will notice there is a stain under the nickel and our custom in doing this work is to scour it and hang 12 sides on a hook, running it through the usual dips and then placing it in the solution. After the work is finished we always find 3 or 4 sides that show this stain. The stain must occur after the plating.

A.—We have given the matter careful consideration and do not agree as regards the stain occurring after plating. It appears to us like a stain that might come if your hydrochloric acid dips become impregnated with copper in some manner, and some blades, containing more carbon than others, caused a deposit of the copper; or, again, it might result if you give the blades a final dip in the potash and this gets contaminated with wax that is used in the polishing compositions. This floats upon the surface of the potash but is invisible. We have oftentimes seen brass goods with such a stain, that was caused in this way, or came from washing the articles in benzine and not properly drying after such an operation. Wax is insoluble, but the nickel solution will cover it, leaving a dullish stain that shows under the nickel when polished.—C. P.

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Q.—My brass solution will not plate yellow. When it is cold it has a bronze shade, and when I heat it to 100 degrees it plates red. I have been putting in copper and zinc and a little carbonate ammonia, but it will not plate yellow.

A.—Add to your brass solution 2 ounces bisulphite of soda to each gallon and 1 ounce carbonate of soda. If a coppery color results then dissolve carbonate of zinc in the proportion of 1 part zinc to 3 parts strong water ammonia. Make up ½ gallon of this and stir a little into the solution. The color will change quickly. If, after adding the soda salt, a good color result, do not add the ammonia and zinc. For good

effects in brass solutions add only copper, then maintain the color by adding ammonia and zinc as mentioned. You will be surprised how little zinc is necessary in a brass bath, especially when a good color is desired.—C. P.

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Q.—Have bought a nickel plating outfit from one of your advertisers, as I wish to do my own plating, but so far have not been successful, as you will see by the samples. The bright one is what I have been receiving and the dull one is what I did. Please tell me the trouble.

A.—The trouble you are experiencing is probably due not so much to the plating itself as to the preparation of the surface. You should pursue the following method: First remove the grease by tumbling in sawdust; then remove and retumble in macerated leather meal, adding a little crocus powder. This should occupy 10 hours at least. A good polished surface will be the result. Cleanse your work and then plate in your regular manner, and if your solution is correct your work should come out as bright as the sample made by the other firm. If not your solution is at fault. By adding 2 or 3 ounces single sulphate of nickel to each gallon of solution a whiter deposit will be obtained. If necessary retumble again in the leather meal and a little Vienna lime for 10 or 15 minutes.—C. P.

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Q.—Will you give me an oxidizing solution that will give a fine blue black color both on sterling silver and fine silver. I prefer a dipping solution—one that I can heat. I have tried iron sulphate and platinum and others, but without good results.

A.—Prepare a cold solution consisting of 2 ounces of liver of sulphur and ½ ounce strong water ammonia in each gallon of water. After cleaning and scratch brushing your work it is necessary to give it a flash of copper in a cyanide bath, consisting of

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|---|---|
| Carbonate of copper | 3 ozs. |
| Bisulphite of soda | 2 " |
| Sal soda | 1 " |
| Cyanide of potassium | 4 " |
| Water | 1 gal. |

If possible use this warm; 2 or 3 seconds' deposit will be sufficient. Now oxidize in the manner mentioned. A smoky black will be produced; now scratch brush wet to bring up the color, using a little sal soda in the brush water. This method will give you a rich blue black or gun metal finish. Relieve, if necessary, on the high lights, and then dry out in the usual way.

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Q.—(1) In nickel plating cast iron one uses a strong acid dip. Even after rinsing there is more or less acid stays on the metal, and this finds its way to the nickel bath, which in time becomes too acid. Can we add carbonate of ammonia to get rid of the acid, instead of aqua ammonia? (2) How is arsenous acid made, and is it practical to use this in brass solutions to bring out the color?

A.—(1) Usually in nickel plating iron, the solution becomes too alkaline, necessitating slight additions of acid. When the solution becomes acid a little aqua ammonia is the best remedy. This, combining with the free sulphuric acid, forms ammonia sulphate, which is a part of the regular double nickel salts, and is the best method to pursue. Carbonate of nickel is also satisfactory. This combining with an excess of acid forms again sulphate of nickel, which enriches the bath and also neutralizes the free acid. (2) Arsenous acid is the white arsenic of commerce, and can be purchased of any chemical house. It can be easily dissolved with the aid of caustic soda, using 1 part of the soda to 2 parts arsenic in boiling water. A little added to the solution brightens the color. Ammonia is added to bring up the zinc, producing a more yellow color. —C. P.

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Q.—Please let me know how clocks are gilded that have a dead yellow color.

A.—We presume you refer to ormolu gold, upon novelty clocks. These goods are usually made in slush molds from an alloy of lead and antimony, 90 parts lead and 10 parts antimony, which is often referred to as black metal. The surface is cut down with tripoli or sand-buffed in the usual manner, flashed in a cyanide of copper bath, washed and immersed in an acid copper bath for ½ to 1 hour; removed, dried out in boiling water and when cool passed rapidly through a slow acting acid bright dip. This produces the dead or ormolu surface. The articles are then flashed in a weak warm brass solution; this gives the yellow surface. The articles are again washed and gilded for a few seconds in a hot yellow gilding solution; dried out carefully by the aid of a little plater's compound added to the boiling wash water, and at last dried with soft cloths or in boxwood sawdust. The high lights are then hand burnished; afterward the articles are lacquered or sprayed with a transparent collodion lacquer.—C. P.

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Q.—I would like a formula for verde antique.

A.—Copper plate and oxidize your work in the regular manner, first obtaining a good deposit of copper. Then prepare a verde antique solution as follows:

| | |
|---|---|
| Sulphate of zinc | 8 ozs. |
| Sal ammoniac | 4 ozs. |
| Sulphate of copper | 2 ozs. |
| Glycerine | ½ oz. |
| Water, slightly warm | 1 gal. |

Immerse your articles in this solution for a few seconds, then hang up to dry slightly. A greenish color will develop. Now, while moist, use a painter's sash tool; slightly moisten the brush at the tip with a little of the verde solution, and finally stipple the articles. This brings up the color and produces the varigated effect. If a greener tone is desired add a little common salt to a portion of the solution used for stippling; allow to dry and then lacquer by dipping in a transparent dip lacquer. Afterward apply a very thin coating of beeswax dissolved in turpentine, and polish on a canton flannel buff wheel.—C. P.

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Q.—Kindly give us a good receipt for anything brass plated to stop the spotting out of work which is caused from either the zinc or cyanide. If the work stands over night after the lacquer is on the spots will be there in the morning.

A.—Immerse your brass plated articles in boiling water for a few minutes. Then remove and boil out in a solution of cream of tartar, about 1 ounce to the gallon, for 10 or 15 minutes; rince in boiling water again and proceed in your usual manner. We do not think you will have any further trouble if this method is followed.—C. P.

# METALLURGICAL DIGEST

A REVIEW OF METALLURGICAL MATTERS OF THE WORLD.
TRANSLATED AND EDITED BY IRVING LANGMUIR, MET. E.

## "MAGNALIUM."

According to an article in the "Metall-Technik" (Nov. 16 and 23, 1907), it appears as though the long search for an alloy having the lightness of aluminum and the workability and strength of brass has at last been successful. The alloy of aluminum with magnesium, called magnalium, which has been prepared by Dr. Ludwig Mach, seems to possess nearly all of the desirable properties, the lack of which prevents the more geenral use of aluminum. There have been many previous attempts to produce aluminum-magnesium alloys, but in every case the alloy obtained was brittle, porous and easily attacked by air and water, so that it could find little or no practical application. Quite recently, however, Dr. Mach showed that these undesirable properties were caused by the presence of impurities, principally sodium, carbon, and nitrogen, and that, if 2 to 12 parts of magnesium are added to 100 parts of molten aluminum free from the above mentioned impurities, an alloy is obtained having the most admirable properties.

In view of the pressing need, which is rapidly arising, for a very light, yet strong metal, a description of the properties of this alloy and of the methods of working it will not be out of place.

The alloy melts at about 1220° F. to a fluid liquid which casts well, the shrinkage in cooling being about 1.7 to 2. per cent.

For casting it is best melted in a grafite crucible with a well fitting cover, to a temperature as little as possible above its melting point. To protect the molten metal still further from oxidation it is sometimes advisable to cover it with a little cryolite or charcoal. The temperature of the furnace should be kept uniform and not too high. The molten metal is well stirred and skimmed before pouring. The molds may be of either sand or iron, the latter having, however, the advantage of rapidly cooling the casting and thus yielding a stronger and tougher metal. With the sand molds the sand should not be packed tightly, and there should be an ample supply of vents to carry off the gases. Flow gates should also be provided so as to allow the scum of oxide to rise where it can do no harm.

A trained foundryman after some experience with the alloy will have no trouble in obtaining perfect non-porous castings.

On remelting scrap magnalium in fairly large pieces the loss due to oxidation, etc., never excedes ½ to 1 per cent. But in remelting turnings or filings of this alloy the average loss is from 10 to 15 per cent.

The castings may be readily forged, the best results being obtained when the metal is heated to a temperature just sufficient to clear a splinter of wood brought in contact with it, but is otherwise treated similarly to soft steel.

The tenacity, malleability and ductility depend to a large exten on the heat treatment and mechanical treatment which the metal has undergone. The speed of cooling is the factor of most importance; the more rapid the cooling the greater the tensil strength and toughness will be. Hence, the strength and malleability are much increased by casting into an iron mold and quenching in water. In the case of large castings or in other cases where the cooling cannot be made rapid the best results are obtained with alloys containing 2 to 4 per cent. of magnesium, while for smaller castings the alloys with higher percentages of magnesium are preferable.

Magnalium may be rolled out into thin plates, but until it has been reduced to about ⅛ inch thickness it must be annealed after each pass through the rolls. It is best, especially when rolling the thicker plates, to have the rolls heated to 210° to 300° F. Nearly as much power is required to roll magnalium as is used for steel plate.

Wire and tubes may be drawn with readiness if they are frequently annealed to a very dull red heat.

One of the best features of magnalium is the great ease with which it may be turned, planed or drilled. With he cutting tool moving at high speed, magnalium may be turned or cut like soft steel, yielding trimmings of great length. The surface of the metal after turning is perfectly smooth and bright. Even the finest screw threads may be cut with ease, and the metal can be filed as readily as the best brass. By a rather complicated process it has been found possible to solder magnalium.

The specific gravity of magnalium is 2.4 to 2.57, thus less than that of aluminum itself (2,64) and considerably less than the other alloys of aluminum (3 to 3.6).

The tensil strength is about the same as that of brass, but depends largely on the heat treatment. A sample of the alloy containing 10 per cent of magnesium and which had been rapidly cooled showed a tensil strength of 34,000 lbs. per sq. inch. Wires made of an alloy with 4 per cent of magnesium have a strength of 41,000 lbs. per sq. inch, while if the bars from which the wire is drawn are first forged, the tensil strength reaches 53,000 lbs. per sq. inch. An alloy with 10 per cent. of magnesium cannot well be worked by rolling or forging, but is perfectly adapted to pressing. The walls of a thin pressed tube gave the remarkably high tensil strength of 72,000 lbs. per sq. inch.

The following table gives the results of some tests of the tensil strength and corresponding elongations of various samples of magnalium. These tests were made by the Physikalisch-Techniscke Reichsanstalt at Charlottenburg, an institution similar to our Bureau of Standards:

| Composition of the Alloys—Parts of Mg. to 100 Parts of Al. | Tensil Strength. Lbs./Sq. In. Cast in Sand. | Elongation, % | Tensil Strength. Lbs./Sq. In. Cast in Iron Mold. | Elongation, % | Tensil Strength. Lbs./Sq. In. Cast Quenched in Water. | Elongation, % | Tensil Strength. Lbs./Sq. In. Rolled Sheets Soft. | Elongation, % | Tensil Strength. Lbs./Sq. In. Rolled Sheets Hard. | Elongation, % |
|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 17,800 | 3 | 28,500 | 2 | 40,000 | 1 | 25,700 | 18 | 41,000 | 2.7 |
| 4 | ..... | .. | 25,000 | 2 | ..... | .. | 28,600 | 8 | 44,500 | 2.1 |
| 6 | ..... | .. | ..... | .. | 57,000 | 1 | 28,000 | 17 | 44,000 | 1 |
| 8 | ..... | .. | ..... | .. | 55,000 | 1.6 | ..... | .. | ..... | .. |
| 10 | 21,300 | 2.4 | 33,400 | 3.4 | 61,000 | 4.2 | ..... | .. | ..... | .. |

## NOTES ON THE ELECTROLYTIC DEPOSITION OF ZINC FROM SOLUTIONS OF ZINC FLUROSILICATE.

By Robert Goldschmidt.

[Translated from the *Revue d'Electrochemie et d'Electrometallurgie.*]

The electrolytic deposition of zinc presents many serious difficulties, because of the tendency of zinc to form spongy deposits. In many cases this tendency has made the application of electrochemical methods to the metallurgy of zinc a very difficult matter. Usually zinc will give at the start a uniform and adherent coating on the cathode, but gradually the layer becomes uneven, rough and then spongy, or else shows crystalline tree like growths.

The cause underlying the formation of these commercially useless deposits has not yet been found with certainty. Mylius and Fromm, Nahsen and Edison believe that such deposits are caused by the formation of zinc oxide during the electrolysis. Siemens and Halske, on the other hand, explain the phenomena by the production of an unstable hydride of zinc which acts unfavorably on the homogeneous deposition of the molecules of the metal. Still other authorities, such as Foerster and Günther, attribute the formation of the spongy zinc to a precipitate of zinc hydroxide.

Many attempts have been made to avoid the spongy deposits of zinc, but the results have not been very satisfactory; the processes which yield good metallic deposits of this metal are rare and expensive.

During some experiments undertaken with the object of obtaining negative plates of zinc for storage batteries we have had opportunity to observe the deposition of zinc from fluosilicate solutions under the most diverse conditions. The electrolyte we employed was always fluosilicic acid of 20° Baume, exactly neutralized by zinc carbonate.

The results of our experiments were as follows:

Using a stationary cathode we were not able to obtain a

uniform dense deposit. This deposit appeared, according to the circumstances (concentration of the electrolyte, its degree of acidity, the current-density, etc.), either as a spongy, but very adherent deposit or as a non-adherent mud of a dark gray color, or, again, even as crystalline well developed tree-like formations.

By employing a cathode rotating at a velocity of about 1,000 revolutions a minute we still found that after electrolyzing the acidified solution for one hour (using a current density of from 4.7 to 28. amperes per square foot), the zinc was deposited in a spongy non-adherent form of a very dark gray color.

By doubling the speed of rotation the deposit was somewhat better, but still not uniform. With yet further increase of speed there was less sponginess, but the crystalline tree-like formations were still present. When the duration of any of these experiments was prolonged the tree-like formations increased in size with the amount of zinc deposited.

With the object of obtaining a uniform and adherent deposit of zinc, we then added some very fine sand to the electrolyte. As a result we found that the deposit was always perfect, uniform, dense and adherent and of a clear gray color, under the most varied conditions of the speed of rotation of the electrode, concentration of electrolyte and current-density. The character of these deposits was not modified even after several hours of electrolysis.

We suppose that the sand kept in movement by the rotation of the cathode acts as a polisher by smoothing down all points which might otherwise give rise to tree-like growths or spongy deposits. One might suppose that the friction and polishing would deminish the amount of zinc deposited, but by calculating the quantity of metal which should theoretically be deposited and by determining the amount actually deposited we found that the differences were so slight as to be negligable, as they were not shown by ordinary balances.

In all the experiments we used as electrolyte the solution previously described and as anodes plates of pure zinc.

# Associations and Societies

REPORTS OF THE PROCEEDINGS OF THE METAL TRADES ORGANIZATIONS.

NEW ENGLAND MANUFACTURING JEWELERS' AND SILVERSMITHS' ASSOCIATION.—The annual banquet of this association was held in Infantry Hall, Providence, R. I., on the evening of February 14. It was a success from every point of view, over five hundred members and guests being in attendance. The entire hall was elaborately decorated with flags and bunting, and over the stage was suspended a banner of welcome. Among the first speakers was Dr. Willard Scott, who said, in part:

"Times are changed from what they were once. Nowadays the old-time priest, whether he be Protestant or Catholic, is either ridiculed by the scornful or boycotted by the sensible. People now demand that a minister shall minister. The fact is that they have joked the ancient theology of a starched shirt front and white collar off the map.

"But for a Protestant or Catholic clergyman who ministers with dignity the proper offices of the church and then goes out to become a good citizen and a good companion, believing in men and admiring them, there is plenty of place in this world of today. I believe in the citizen minister and in the ministering citizen. I like to take it for granted that a man is sound in his theology if he is decent in his sociology."

Senator Blackburn, speaking of the Panama Canal zone, said that according to present plans there will be but 8½ miles of canal proper, then two lakes, then 10 miles of sea level canal out to the Atlantic.

"He would be a bold man indeed who would hazard a prediction as to when this great work would be accomplished. There is a great difference between railroad engineering and army engineering. Last April the President reorganized this commission. He replaced the railroad engineers with army engineers. Any good results of theirs reflect not at all upon me. Prior to their advent no satisfactory organization of labor had been maintained.

"To-day no man can say that an efficient organization is not at work on the canal. Since their arrival there every month but one has broken the record of its predecessor. In January we took out 2,712,000 cubic yards."

The banquet was one of the most successful in the history of the association.

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AMERICAN BRASS FOUNDERS' ASSOCIATION.—President, Charles J. Caley, New Britain, Conn.; Secretary, Andrew M. Fairlie, McCays, Tenn.; Treasurer, John H. Sheeler, Philadelphia, Pa. The object of the association is purely education, and is accomplished by the collection of such information as will be of benefit to the members and to general shop practice; by the presentation of papers on appropriate subjects, and by the publication of such literature.

The following have recently been elected members of the Association: David Hunt, Jr., Cleveland, O.; Edmund A. Merriam, Torrington, Conn.; Pittsburg Brass Mfg. Company, Pittsburg, Pa.; Hazard, Coates & Bennett Company, Rochester, N. Y.; H. B. Sherman, Battle Creek, Mich.; E. H. Mumford, Philadelphia, Pa.; Davis Price Foundry & Machine Company, New Cumberland, W. Va.; Tampa Foundry & Machine Company, Tampa, Fla.; F. A. Coleman, Cleveland, O.; James Morrison Brass Mfg. Company, Toronto, Canada.

The first annual convention of the Association will be held at Toronto, Canada, the second week in June. Every member is urged to attend this first convention or to send delegates. All members should make their plans ahead, so that the second week in June will find them in Toronto.

Members intending to contribute papers to be read at the convention should notify the Secretary at once of their intention, and if possible should hand in their subjects now. Manuscript should be in the hands of the Secretary on or before the 1st of May.

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THE FOUNDRY SUPPLY ASSOCIATION.—President, E. H. Mumford, E. H. Mumford Company, Philadelphia, Pa. Vice-Presidents, W. S. Quigley, The Rockwell Engineering Company, New York City; H. R. Atwater, The Osborn Manufacturing Company, Cleveland, O.; William Chamberlain, The Garden City Sand Company, Chicago, Ill. Treasurer, J. S. McCormick, J. S. McCormick Company, Pittsburg, Pa. Secretary, H. M. Lane, 1924 Prospect avenue, Cleveland, O.

The object of the Association is to hold an exhibit of foundry supplies and equipment at the time of the meeting of the American Foundrymen's Association.

A very convenient and attractive pamphlet dealing with the Toronto convention, June 8-12, has been prepared by the secretary; every one expecting to attend the convention should obtain one of these. The pamphlet presents the advantages of Toronto as a convention city, and outlines the strong points of the city itself, and the features which will make a visit to the convention worth while. At Cleveland the exhibit occupied a little less than 25,000 square feet of floor space, and at Philadelphia about 45,000, while at Toronto the available space is 121,000. Two buildings have been secured. One of these is Machinery Hall with its permanent equipment of shafting, engines, boilers, etc., and the other is the magnificent new Process Building, one bay of which is provided with power and two bays are suitable for still exhibits. This building is strong enough to carry any exhibit that will be likely to be placed in it. The power is derived entirely from shafting operated by electric motors. In the other building there are supplies of electricity, compressed air, and water as may be required. Arrangements have been made with the customs authorities of Canada in accordance with which exhibits will enter in bond, the entire exhibit being a bonded warehouse. The exhibits can then be returned to this country free of duty. Duty will be charged on most souvenirs, catalogues and printed matter. An auditorium seating 1,500 will be available for meetings. Negotiations are now on with the railroads

to try and obtain concessions in connection with freight rates, as the Canadian roads have in the past granted such concessions for the annual Toronto exhibit. Members are urged to communicate with the secretary as early as possible concerning their requirements as to space and power.

REPORT OF THE MEETING OF THE EXECUTIVE COMMITTEE OF THE FOUNDRY SUPPLY ASSOCIATION, HELD IN TORONTO.

Mr. Somerville, chairman of the Reception Committee at Toronto, and L. L. Anthes, Vice-President of the American Foundrymen's Association, who has charge of the entertainment to be furnished at Toronto, together with several members of the Manufacturers' Association and others interested in the success of the convention and exhibit, were also present to assist in the planning for that event.

The fine large exhibit buildings were inspected and all of the members were much pleased with the facilities furnished.

Two new applications for membership were received during the meeting, making a total of six new members within a week. A considerable number of applications have also been received thus early for exhibit space, both in the power section and in the Process Building. These matters were reported and discussed at the meeting.

One interesting feature was the fact that Mr. De Cleroy of Montreal presented his application for membership and offered to exhibit one of his French cupolas in operation so as to furnish molding machine exhibitors with iron for pouring molds. This is the first time that the Association has had melted iron available at the convention.

The space rates this year were fixed as follows: 25 cents per square foot for the first 100 feet; 20 cents per square foot for the second 100 square feet, and 15 cents per square foot for all additional space. This charge includes light and power from shafting where this is necessary.

Special arrangements will be made where firms desire extra illumination in the way of electric signs or electric display. Intending exhibitors will kindly note that the building now contains a large number of booths, so that most if not all of the exhibitors can be provided at least with railings; also that the floors are of such a nature that they require no extra floors laid upon them, as was the case at Philadelphia. This makes it possible to exhibit much more cheaply than heretofore.

Among the rules passed by the committee for the guidance of the Secretary for this year are the following:

No exhibits can be received for installation in the buildings until freight and other charges have been paid.

A payment of 25 per cent. of the space charge is to be made within ten days of the time of allotment; and the balance paid not later than ten days previous to the convention.

No space shall be allotted to a given firm or person until all dues and other accounts due the Association from such firm or person shall have been paid in full.

Non-members of the Asociation shall be charged an admission fee of 25 cents to the exhibit, Association members being admitted by badge.

The matter of co-operation with the local Toronto Entertainment Committee was discussed and it was voted to make a definite subscription of $500 to their entertainment fund, and in addition to give the Toronto Entertainment Committee $40 from the initiation fee and dues of each new member joining the Association from Canada and taking part in this year's convention and exhibit.

The reports of the secretary and Treasurer for the past year were then read and approved. The Secretary was asked to form a budget of probable expenses for the convention and to submit the same to the President. In the Secretary's report he stated that there were 106 applications for membership received previous to the Philadelphia convention. Of this number three withdrew previous to the convention and did not exhibit or attend. Two other companies have gone out of business since, and a third has transferred its foundry supply business to another concern, so that the net active membership on February 1st was 100 members. As already mentioned, six applications for membership have been received since that date.

The fact that the books were not audited and the accounts balanced until nearly nine months after the last convention has necessitated including in the report a large portion of the expense incurred in preparing for the coming convention. Notwithstanding this fact, the accounts show a substantial balance in the treasury and the affairs of the Association are in excellent condition.

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ASSOCIATED FOUNDRY FOREMEN.—President, James F. Webb, Davenport Locomotive Company, Davenport, Ia.; secretary-treasurer, F. C. Everitt, J. L. Mott Company, Trenton, N. Y. The association meets in annual convention, but the local organizations meet monthly except during the summer months. The object of the association is purely educational along foundry interests, and the work is carried on by the local bodies. There are ten local divisions, those of Chicago, Cincinnati and Philadelphia being particularly active.

At the January meeting of the Philadelphia branch Mr. E. H. Mumford gave a very interesting talk on the French system of molding machines, with lantern illustrations. At the February meeting the subject of the evening was general accounting and foundry costs. An exhaustive paper was read on this subject by Sidney Long, a well-known accountant and specialist on cost systems. The paper was of unusual interest and provoked considerable discussion. The meeting was very largely attended, there being about seventy-five present.

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ITEMS OF INTEREST TO THE INDIVIDUAL.

Hugh McPhee, who has been foreman of a number of brass foundries, has recently become foreman of the Robert Mitchell Company of Montreal, Canada.

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Nelson F. Flanagan, formerly of Waterbury, Conn., has accepted a position with the Pittsburgh (Pa.) Lamp, Brass & Glass Company as foundry foreman.

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H. C. Simmons is now connected with the Southern Electro-Plating Works as superintendent, having bought out the interest of their former superintendent, E. W. Carr.

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George E. Tyson, for many years connected with the Reading Hardware Company, of Reading, Pa., has accepted the position of superintendent of the Penn Hardware Company, same place.

J. H. Russell, formerly connected with the plating department of the Western Electric Company of New York, is now connected with the plating department of the Ed. Schroeder Lamp Works of Jersey City, N. J.

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William M. Davis announces that he is now established independently as a lubricating engineer and has opened an office at 93 Broad street, Boston, Mass. His experience and knowledge is at the trade service in the making of tests and analysis of lubricating oils and reporting on lubrication conditions and requirements with a view of reducing costs.

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C. G. Backus, who has been superintendent for the Zucker & Levett & Loeb Company of New York for many years, is now superintendent of installation and inspection for that company,

and his position as superintendent is now being filled by Walter L. Loeb, son of the president, Charles Loeb.

Since the death of J. K. Bougher, former president and general manager of the J. W. Paxson Company of Philadelphia, Pa., there have been some changes in the management of the concern. The following are the present officers: H. M. Bougher, president and general manager; L. B. Shaw, vice-president and marine superintendent; Howard Evans, treasurer; J. S. Hibbs, assistant general manager; S. C. Bougher, purchasing agent and secretary, and A. G. Warren, consulting engineer.

After five years' experience as an assistant examiner in the different departments of the United States Patent Office, including the interference division, and having practiced in New York City, Langdon Moore has established law offices in the Washington Loan & Trust Building, Washington, D. C., for the practice of patent and trade-mark law in all its branches for the United States Patent Office and Court, and will be pleased to represent readers of THE METAL INDUSTRY in any of their patent cases.

W. M. Corse, one of the vice-presidents of the American Brass Founders' Association and secretary of the Society of Detroit Chemists, has been busy lately organizing a Detroit Foundrymen's Association. At the preliminary meeting held recently there was an attendance of 50. Mr. Corse was elected temporary chairman and Thomas F. Meek of the Detroit Steel Casting Company temporary secretary. It is expected the Detroit foundrymen will take their place in the various local foundrymen's associations of the country.

H. R. Hosbach, for ten years superintendent at Thomas G. Brown & Sons, 33 Bethune street, New York, the oldest silver shop in the country, has resigned and will shortly start in business for himself manufacturing silver goods. He will also act as agent for the Leuchter processes, which include a method of mechanically producing larger or smaller models from originals, and a means of producing models with the aid of photography from a sketch or print. Shop rights will be sold for Leuchter methods. Mr. Hosbach's address is 249 West Eleventh street, New York.

Dr. Richard Moldenke is very enthusiastic about the coming convention in June next of foundry interests at Toronto, Canada. He reports all Canada will be there and all of the United States that resides in the vicinity of Canada and expects a rousing meeting. The doctor notes the fact that Toronto and the surrounding country is a beautiful region, including nothing less than Niagara Falls, East Aurora and many other stopping off places for tourists, and he believes that many foundrymen will go to the convention for the sake of visiting the excursion country as well as the convention sights.

## DEATHS.

### JOHN C. KUPFERLE.

John C. Kupferle died at his home in St. Louis, Mo., on February 7th in the seventy-second year of his age. Last spring he celebrated the fiftieth anniversary of entering business on his own account. Mr. Kupferle was born in Cincinnati and attended the public schools there and in St. Louis, to which city he moved when fifteen, securing a position in the brass shop operated by Kupferle Brothers, his father and uncle. After serving his time he decided to enter business for himself and during the war supplied the Union forces with cannon balls. Afterward he made large quantities of hardware and was largely interested in the manufacture of special goods. To the plumbing trade Mr. Kupferle was well known for the fire and yard hydrants he manutured. He married Miss Emma Gross who, with four daughters, survives him.

### J. K. BOUGHER.

J. K. Bougher, president of the J. W. Paxson Company, of Philadelphia, Pa., died at Palm Beach, Fla., February 12, at the age of 68 years. Mr. Bougher was a self-made man, his early days being spent as a tugboat captain on the Delaware River and its tributaries. He served in the Union army during the Rebellion. While still a young man he made the acquaintance of J. W. Paxson and together they formed the J. W. Paxson Company, miners and shippers of foundry sand; the company afterward built facing mills, machine, boiler and blacksmith shops, as well as a factory for making all kinds of wire and bristle brushes, sieves, etc., for foundry use. They also built barges and steamers for carrying their own commodities inland as well as along the Atlantic coast.

J. K. BOUGHER.

Mr. Bougher built and equipped the trolley system between Burlington, N. J., and Mount Holly, a distance of six miles, and from there to Moorestown, a distance of seven miles, connecting with the system running into Camden. This undertaking was carried out at his own expense. He was president of the J. W. Paxson Company, the Lumberton Sand Company, Welch Mt. Mining & Kaolin Company, and the Burlington County Traction Company, and was a director of the Kensington National Bank. He was also a member of the Union League, Manufacturers' Club and Columbia Club, of Philadelphia. He is survived by a widow and six children.

### JAMES POWELL.

James Powell, president of the Wm. Powell Co., of Cincinnati, Ohio, entered into rest from his late residence, Avondale, a suburban part of Cincinnati, February 25, 1908. His illness commenced with a severe cold contracted over a year ago. A sojourn in Florida last winter failed to restore his health, and later on Bright's disease developed until it reached the fatal state.

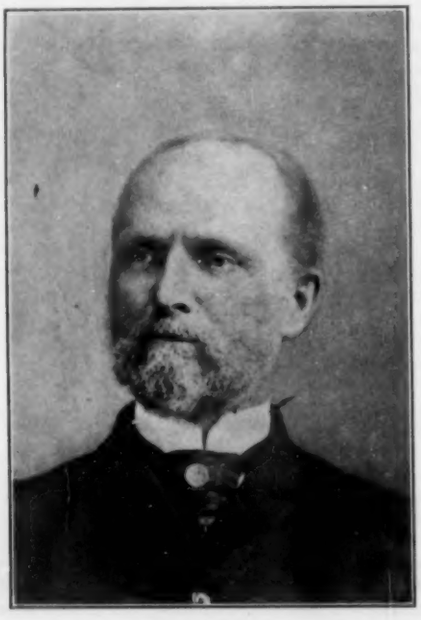
Mr. Powell had been intimately and continuously connected with the business of manufacturing brass valves, brass engineering specialties and kindred brass goods since his boyhood of fourteen years of age. With his parents, who were temporarily in Ghent, Belgium (although England was their home), he came to America at the age of three years.

In 1846 the father, William Powell, commenced making brass plumbing supplies in a most humble way, his only "hand" being his son James, the subject of this notice. It can truly be said that this venture was the founding of the manufacturing of plumbers' brass goods in the West. From this small beginning the business continued to grow until in 1862 the record shows that seventy-five hands were employed, the reputation of the goods made having caused a demand compelling a constantly increasing force.

History contains this "War Item." During the Civil War (1861-1865) General Burnside, in anticipation of an attack to be made by General Longstreet against Knoxville, Tenn., sent a messenger to Wm. Powell & Co. for one thousand pairs of spurs of a special pattern to be delivered in forty-eight hours. There was not a casting of such goods in the house, patterns had to be made, but notwithstanding this the goods were boxed and shipped within two hours of the stipulated time.

The progress of the company was such that in 1886 the business merged into a stock company with James Powell as president and manager, which offices he actively filled until his death.

Thus from the beginning of his business career as the only one "hand" in his father's work room he witnessed a business growth to the present extensive establishment employing about five hundred hands with a paid up capital of $500,000.



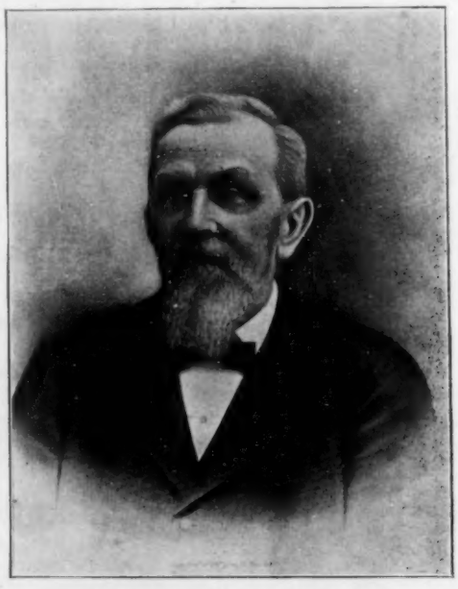
JAMES POWELL.

As an inventor Mr. Powell's reputation is world-wide. Mr. Powell was awake to public questions, writing frequently for journals and magazines. He was a profound reader and student and looked systematically for his magazines and journals, prizing them highly and preserving them in their proper places.

He belonged to many societies, among them we notice American Society of Mechanical Engineers, National Geographic Society, National Association of Manufacturers, Manufacturers' Club of Cincinnati, Queen City Club of Cincinnati, Business Men's Club of Cincinnati, and other business and philanthropic societies.

## EDWARD GOODWIN BURNHAM.

Edward Goodwin Burnham, one of Bridgeport's (Conn.) leading captains of industry, ex-State Senator and a zealous promoter of public welfare in his community, died February 28, 1908. Mr. Burnham was born in Springfield, Mass., June 2, 1827, being a descendant of Thomas Burnham, who came from England to Hartford in 1635. His father was one of the inspectors in the United States Armory at Springfield, and was a man of great firmness of character. While he spent most of his boyhood at work on a farm he was intensely interested in mechanics and studied mechanical subjects outside of school hours. At the age of sixteen he went to Brattleboro, Vt., to learn the machinist's trade, and after due apprenticeship he entered the armory at Springfield as machinist and contractor. Some years later he moved to Bridgeport and engaged with Dwight, Chapin & Company in the manufacture of firearms for the Government. At the close of the war he became interested in the manufacture of steam, gas and water fittings and formed the corporation of Belknap & Burnham. This business grew so rapidly that it became necessary to enlarge the plant, and in 1874 the firm of Eaton, Cole & Burnham Company was organized, with Mr. Burnham as vice-president. He subsequently became the president and was largely instrumental in building up the business, until it became one of the most important in Bridgeport. In 1905 Mr. Burnham disposed of his interests in the concern and retired from active duties of a commercial nature. He was vice-president of the United Illuminating Company, president of the Bridgeport Crucible Company, director of the City National Bank, vice-president of the Bridgeport Hospital and a trustee of the Bridgeport Protestant Orphan Asylum. In September, 1853, Mr. Burnham married Mary Ferree of Springfield. All of the three children born to them are now living.



EDWARD GOODWIN BURNHAM.

# PATENTS

REVIEW OF CURRENT PATENTS OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

870,817. November 12, 1907. Art of Coating Pipes. Edgar A. Custer, Philadelphia, Pa. According to this invention the pipe is cast in permanent molds without the use of sand or gritty matter. The molten metal is introduced into the mold in equal portions and at uniform pressure and velocity so as to obtain, by the flowing of the metal in the mold, a pipe perfect in form and with a smooth exterior surface.

868,902. October 22, 1907. Forming Die. Herman S. Albrecht, St. Louis, Mo. This forming die is intended for use in flaring sheet metal bodies to render them bell shape or other flaring shape. The piece to be flared, say a pipe, is introduced into the female portion of the die and the male member brought up to engage the projecting end of the pipe, which action flares it into the open end of the holding die.

873,430. December 10, 1907. MEANS FOR CUTTING COIL SPRINGS. Noah S. C. Harter, of Waukegan, Ill., assignor to the American Steel & Wire Company, of Chicago, Ill. This machine cuts the spring into suitable lengths after it has been coiled. The cutting mechanism is so arranged as to be thrown into action automatically at the proper times by the closing of an electric circuit, which is affected by means of a circuit closing mechanism located in the path of and actuated by the movement of the spring.

868,957. October 22, 1907. MOLDING MACHINE. Charles W. Woods, Elizabeth, N. J. This invention is intended to provide a molding machine that will compress the sand in the mold, pack it well around the pattern, and release the pattern from the mold in a smooth manner, and to vibrate automatically the pattern boards and the platforms on which they are supported, so that the sand in the mold will be evenly distributed and will form a smooth surface for the casting. The mold box used in connection with the machine allows an inner casing of metal to be slid in and out of it during the process of molding, and this inner lining is supposed to hold the sand, and it is thus possible to use one mold box for any number of linings, and the linings are then stacked up awaiting the molder's operation. The machine is provided with side bearings which go to make up a more rigid structure when the machine is in operation, and to form a more even mold by reason of maintaining the patterns flat, when they are inserted in the sand.

878,345. February 4, 1908. SAND MOULDING MACHINE. James J. Chipchase, Horwich, England. The improvements which form the subject of this invention relate to molding machines such as are employed in a foundry for the production of axle boxes and other metal castings; the object of the invention is to prevent any distortion either in the pattern or in the sand when the pattern is being drawn therefrom, and thereby obtain perfect castings, and uniformity when a number of the same kind are required.

# TRADE NEWS

TRADE NEWS OF INTEREST DESIRED FROM ALL OF OUR READERS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

A new gold and silver electro-plating firm recently started is that of Lesch & Farrell, 210 Canal street, New York City.

The Elmira Machine Works, makers of machinery and specialties, have moved their factory from Elmira to Grover, Pa.

Aluminum all grades and prices on application is the announcement of the United States Reduction Company, of 50 Law avenue, Chicago, Ill.

Brass, Bronze and Aluminum Castings—We can deliver the goods—is the slogan of the Rostrand Manufacturing Company of Milford, Conn.

The Mott Wheel Works, of Utica, N. Y., are installing a small plant for the tinning of steel wire wheels. The company also operate a plating room.

The Venango Manufacturing Company, of Franklin, Pa., are the successors of the Kent Manufacturing Company, of Kent, O., manufacturers of railway supplies.

The Columbia Manufacturing Company, manufacturing jewelers, fromerly located at 46 Oliver street, Newark, N. J., have moved to 24 Boudinot street, of the same city.

The Essex Metal Novelty Works, of 677 Springfield avenue, Newark, N. J., have started to manufacture belt buckles and hat pins in addition to their extended line of metal novelties.

Linton & Co., 93 Pine street, Providence, R. I., announce that they are manufacturers of seamless drawn tubing in copper and brass and small sizes from 12 an inch O. D. to 1/32 of an inch or smaller.

H. Kramer & Co., 353 South Canal street, Chicago, Ill., report that their specialties are spelter, ingot brass and pig lead. They are smelters, refiners and dealers in drosses, skimmings, oxides, etc., of metals.

The American Wire Brush Company, manufacturers of the "Minerva" brush, have moved from 25 Broad street to 277 Greenwich street, New York, where they are in a better position to handle the jobbing and wholesale trade.

Isaac G. Johnson & Co., Spuyten Duyvil, N. Y., are making a specialty of nickel and nickel alloy castings of every size and description, and ask interested parties to send blueprints or drawings, and prices will be returned promptly.

Dufur & Company, manufacturers of wire goods at 309 North Howard street, Baltimore, Md., have enlarged their weaving department and are now in a better condition than ever before to furnish promptly all grades of steel, iron, brass and copper wire cloths.

The Norwich Nickel & Brass Company, of Norwich, Conn., has begun operations in its new plant on Chestnut street. The new plant places at the disposal of the company greatly enlarged facilities.

The Rickersburg Brass Company, of Cleveland, O., will break ground as soon as weather permits for a new plant at the corner of 37th street and Perkins avenue. The building will contain one of the most uptodate brass foundries and machine shops in the country. It will be built of brick, and will be fireproof throughout.

The Kortum Manufacturing Company, formerly located at Attica, N. Y., announce that they have moved to 10 Pearl street, Buffalo, N. Y., where they will have better facilities and can make shipments more promptly. In addition to their compressed linen polishing wheels the Kortum Company will carry a full line of platers' and polishers' supplies.

The Carlenwright Lamp & Brass Company, Inc., formerly of Philadelphia, has leased the decorating plant at the National Brass Works, Reading, Pa., for the manufacture of decorated lamps, gas and electric portables, globes, domes and novelties. Operations have been started with a force of men brought from Philadelphia, and the number of employees will be increased as soon as all the machinery has been placed in position.

The business of Croselmire & Ackor Company, platinum, gold and silver refiners, of 42 Walnut street, Newark, N. J., has been purchased by Franz Eisenbach & Company, of Offenbach, Germany. The report that the new company is in the combination is not true. We are authorized to state that the new owners are not and never have been connected with the combination—they are absolutely independent and will conduct the business along independent lines.

The John C. Culbert Company, successors to the renowned metal man, John C. Culbert, announces that they are in the market for 500,000 lbs. red grindings, 500,000 lbs. yellow metal grindings, 250,000 lbs. scrap copper wire, 5,000 lbs. red metal, 5,000 lbs.

yellow metal, 500,000 lbs. red washings and 500,000 lbs. yellow metal washings. As in the case of the individual, the company has the "spot cash" for any one who has the whole or any part of this material for sale.

The Norwich Nickel & Brass Company, of New Haven, Conn., are occupying their new factory on Chestnut street. This is a modern three-story brick building provided with all the latest improvements for the carrying on of their business. This concern has made rapid strides during the past few years and the indications are that this will be kept up. The firm do a large business making display frames. The general manager of the company is Edwin A. Tracy.

The Mohawk Valley Brass Foundry, makers of everything in cast or finished brass, have started operations in Utica, N. Y., and have a brass foundry fully equipped at the corner of Blandina and First streets. Within the very near future they expect to begin the manufacture of the 4-way threadless fire hose coupling and the 4-way threadless air brake coupling for the St. Onge Manufacturing Company, of the same city. The general manager of the company is J. P. Tetreault.

At the second annual exhibit of the Chicago Foundry Foremen, held at the Lewis Institute, Chicago, March 5, 6 and 7, the Obermayer Bulletin was voted the official programme of the exhibition. This issue of this deservedly popular publication, gotten out by the S. Obermayer Company, contains a great deal of information regarding several of the larger technical schools of the country. Copies of the Bulletin can be had by addressing the company either at their Cincinnati, Chicago or Pittsburg offices.

The Grasselli Chemical Company, of 60 Wall street, have purchased the business of the Marlou Chemical Works, Jersey City, N. J., manufacturers of Standard Soldering Flux and Standard Tinning Fluid, and are now offering these articles for sale in connection with their Eureka Soldering Flux and Grasselli's Tinning Flux. For the present the Eastern trade will be taken care of by the New York office, but it is expected soon to carry these articles in stock in all cities where the company has branches or agents.

M. M. Andler & Company, dealers in scrap metals at 280 Commercial street, Boston, Mass., have bought all the machinery, equipments, and stock formerly belonging to Goldberg & Rathman, of William C. Rogers, one of the trustees in bankruptcy for the above mentioned concern, for the sum of about $10,000. The purchase includes the good will of the concern. The machinery and equipments will be added to the Andler Company's plant at Cambridgeport, Mass., for the handling of scrap material and the refining of metal drosses.

Our San Francisco correspondent reports that most of the shops are running only four days a week. M. Greenberg's Sons Brass Foundry is fairly busy and are working with their full force. The brass foundry of the George E. Dow Pumping Engine Company are busy with contracts for the Southern Pacific Railroad and are employing two shifts of men. The plant of the Richmond Foundry & Hardware Company, Richmond, Cal., has been sold to H. R. McGuinn, 45 Post street, San Francisco, but the shop will not resume operations until the business outlook warrants its operation.

The Milwaukee Bronze Casting Company, of Milwaukee, Wis., has taken over the business of the Milwaukee Ornamental Manufacturing Company, who have been in business for the past six years making everything in the line of bronze, manganese bronze, brass, aluminum and white metal castings. At the January meeting of the stockholders it was found necessary to build a new and modern foundry in order to keep pace with the rapid growth of the business. It was also decided to increase the capital from $1,000 to $10,000 and to change the name as above noted. The officers are: Albert G. Seeboth, president; Michael Seeboth, secretary and treasurer. The management of the company is in the hands of Casper Reichl.

## MEETINGS

The Canton Art Metal Company, of Canton, O., at a special meeting of the stockholders, held February 15, it was decided to issue an additional $200,000 of preferred stock. The increase will be used to take care of the large increase in the business of the company.

At the annual meeting of the Scovill Manufacturing Company, Waterbury, Conn., held February 12, the old board of directors was re-elected as follows: F. J. Kingsbury, C. P. Goss, M. L. Sperry, H. W. Scovill, E. O. Goss, J. H. Goss and C. M. Demott. The election of officers resulted as follows: President and treasurer, C. P. Goss; vice-president, F. J. Kingsbury; secretary, M. L. Sperry; assistant treasurer, E. O. Goss; assistant secretary, C. M. Demott; superintendent, J. H. Goss.

At the annual meeting of the American Brass Company, held at Waterbury, Conn., February 25, the following officers were elected:—Directors—C. F. Brooker, A. A. Cowles, J. S. Elton, A. C. James, C. H. Dodge, James A. Doughty, J. P. Elton, E. T. Coe, E. L. Frisbie, jr., G. W. Burnham, T. B. Kent and John J. Sinclair. President—Charles F. Brooker. First Vice-President—Edward L. Frisbie, jr. Second Vice-President—Alfred A. Cowles. Thrid Vice-President—James S. Elton. Treasurer—John P. Elton. Secretary—Gordon W. Burnham. Assistant Secretary—James A. Doughty.

The annual meeting of the stockholders of the Haydenville Co., of Haydenville, Mass., manufacturers of brass and iron goods for water, steam and gas, was held in Jersey City, N. J., Wednesday, Feb. 19th. The old board of directors was re-elected; C. J. Hills, president; A. S. Hills, vice-president and treasurer; Richard W. Irwin, of Northampton; Geo. L. Dayton, of Jersey City, N. J., and R. B. Hills, of New York City, secretary.

The business of the past year was the largest in the history of the company. Improvements in manufacturing their varied lines of goods have been made, new designs added to their catalogue, etc. Wherever the trade-mark "Haydenville" appears it stands for excellence and quality. All goods from this old established factory are stamped "Haydenville" and with that on the buyers know they have the company's guarantee for every piece.

## FINANCIAL

The Canton Art Metal Company, of Canton, O., has increased its capital from $200,000 to $400,000.

The Strange Jewelry Company, of Sherman, Tex., has amended its charter, increasing its capital stock from $20,000 to $30,000.

The directors of the International Silver Company have declared a quarterly dividend of 1 per cent. on the preferred stock, payable April 1. This is a reduction of ½ per cent. from the previous disbursement, made on January 1 last.

At a meeting of the stockholders of the New England Watch Company, Waterbury, Conn., held February 24, it was voted to increase the capital stock of the company by adding to the $750,000 of common stock an issue of $250,000 preferred stock, the latter to be dividend bearing at the rate of 7 per cent. per annum. Out of the 30,000 shares of stock 24,455 were represented, and the vote on the increase was unanimous.

For the fiscal year ended December 31, 1907, the report of the International Silver Company shows the company's earnings to have been $933,291, the interest on bonds $327,944 and the consequent balance available for dividends $605,347. After the paying out of $460,817 in dividends on preferred stock there is a balance of $144,530. With a previous surplus of $2,902,377, the total surplus is $3,046,907, according to the report.

## INCORPORATIONS

EAGLE ROOFING & ART WORKS, of Tampa, Fla., has been incorporated with a capital of $30,000 by L. B. Sherrill, president, and W. J. Houlin, secretary.

AMERICAN ELECTROTYPE COMPANY, of Cleveland, O., has been incorporated with a capital of $2,500 by W. H. K. Rose, E. R. Wood, A. W. Lander, Jay Comstock and E. J. Walcott.

THE AMERICAN CASH REGISTER COMPANY, Columbus, O., has been incorporated with a capital of $1,000,000, the incorporators being C. G. Heyne, W. A. Lebrun, W. A. Marsh, F. S. Knox and R. J. Odell.

PAUL GRIMM, INC., 309 Water street, New York City, has been incorporated with a capital of $35,000 to deal in old and new metals. The incorporators are: Paul Grimm, J. F. McKean and O. G. Foelker.

YOUNGSTOWN STOVE & MANUFACTURING COMPANY, of Youngstown, O., has been incorporated with a capital of $10,000 by Moses Weinberg, Abner G. Weinberg, Samuel Weinberg, J. M. Weinberg and William Cosel.

COLUMBIA BRASS FOUNDRY, of Freeport, N. Y., has been incorporated with a capital of $10,000. The directors for the first year are: Robert A. Patrick, George Christians and Mary Christians, all of Freeport.

AMERICAN ARCHITECTS' BRONZE COMPANY has been incorporated in Delaware with a capital of $1,000,000. The incorporators are E. L. Selley, of Brooklyn, N. Y., and L. R. Schultz and F. Frerich, of New York City.

THE PACIFIC BRASS & HARDWARE MANUFACTURING COMPANY, of Los Angeles, Cal., has been incorporated with a capital of $25,000. The directors are: H. F. Bilger, Emil Price, F. E. Lauffer, Joseph Corcoran and E. M. Whitman.

GEORGE W. CUMMINGS TESTING LABORATORIES, of Boston, Mass., has been incorporated with a capital of $50,000. The president is George W. Cummings, Malden, Mass.; treasurer, Fred E. Crawford, Watertown, Mass., and clerk, George W. Cummings, Jr., of Malden.

WEINBERG & SUDZEN COMPANY, of New York City, has been incorporated with a capital of $12,000 to manufacture jewelry, etc. The incorporators are: Max Weinberg, Max S. Weinberg, 718 Sterling place, and Herman Sudzen, 716 Sterling place, all of Brooklyn, N. Y.

LUDWIG NISSEN & COMPANY, of New York City, has been incorporated with a capital of $600,000 to deal in jewelry and precious stones. The directors are: Ludwig Nissen, 1397 Dean street; Emil Knapp, 460 Sixty-seventh street, and John W. Reufer, 505 Throop avenue, all of Brooklyn, N. Y.

THE GRAEBING AUTOMATIC VENTILATING COMPANY, of New York City, has been incorporated to manufacture ventilating apparatus. The capital is $120,000 and the directors are Lawrence S. Graebing, Tuckahoe; Leonard Day, 45 Broadway, New York City, and Burton E. Cummings, Ridgefield Park, N. J.

10K AND 14K MANUFACTURING COMPANY, of New York City, has been incorporated to manufacture jewelry with a capital of $50,000. The directors are: William H. Riedell, 33 Cornell avenue, Yonkers, N. Y.; Leon Kauffman, 2 Rector street, and William C. Little, 156 West 105th street, New York City.

NEW PROCESS CASTING & METAL COMPANY, of Memphis, Tenn., has filed an application for a charter to conduct a general metal, foundry and machine shop business. The concern is capitalized at $50,000. The incorporators are: H. G. Underwood, H. B. White, W. S. Brian, D. S. Rice, A. W. Ketchum and R. E. Caradine

## PRINTED MATTER

DERRICKS AND HOISTS.—We have received from the Parker Hoist & Machine Company, of Chicago, Ill., a large catalogue dealing with their different types of derricks, hoists, winches, etc.

GENERATING SETS.—The Sprague Electric Company, 527 West 34th street, New York City, have perfected a generating set composed of their Type D generator and "ABC" engine mounted upon a common base. This makes a neat, compact outfit especially desirable where space is valuable.

CRUCIBLES.—Blotters are being sent out to the trade by the Waterbury Crucible Company, of Waterbury, Conn. At one side is the picture of a crucible in mighty hot surroundings, since little "divvels" are busy about the fire. One imp, looking over the top, is evidently superintending the brew. Beneath is the legend "It stands any heat."

BALL BEARING EXHAUSTER.—A circular from the Massachusetts Fan Company, of Watertown, Mass., explains their new type of ball bearing exhauster which they have just brought out. The bearings are stated to have the following advantages: absolute alignment, decreased space, freedom from necessity of oiling, and a reduction of journal friction of at least 85 per cent. The balls, which run in hardened steel sleeves, are thoroughly protected from dust by fibre washers.

HYDRAULIC JACKS.—From the Watson-Stillman Company, 26 Cortlandt street, New York City, we have received a circular dealing with their swivel claw hydraulic jacks. This new type of jack has been found very convenient in machine shops building heavy machinery, it being so small in size and light in weight it can be carried easily in the tool boxes of machine and erecting gangs. The toe of the jack is very close to the ground and can be turned to any angle of the operating lever.

DIE CAST PARTS is the title of a pamphlet prepared by the H. H. Franklin Manufacturing Company, of Syracuse, N. Y., in which the wide range and application of their system of die casting are mentioned. Instead of following the old method of making a rough sand casting and then finishing by hand or machine, this process uses a steel die which is the exact mold for the finished article. The result is that the casting leaves the mold accurately finished with all holes, slots, lugs, etc., in their proper position, and the parts are all duplicates, one of the other, and may be used interchangeably. The intricacy of the pattern has no influence upon the castings, the most complicated designs coming out as perfect as the plainest.

OIL BURNING FURNACES AND EQUIPMENT.—A very attractive catalogue has been received from the W. N. Best American Calorific Company, of 11 Broadway, New York City, dealing with their oil burning furnaces. The "Calorex" system of burning liquid fuel consists in a patent burner which atomizes the fuel outside the burner, by means of a high pressure current of air acting at right angles to the flow of oil; a combustion chamber in which combustion of the oil is achieved before it reaches the furnace; a reverboratory arch which deflects the heat downward and concentrates it upon the hearth of the furnace where the work is done; and an auxiliary supply of low pressure air for combustion, which is introduced to the combustion chamber beneath the atomizing current, thus concentrating the heat on the work and sparing the arch. It is claimed the use of this furnace results in greater output, reduced labor cost, and smaller running expense.

## CATALOGUE BUREAU

THE METAL INDUSTRY has established a Catalogue Bureau by which it will prepare and do all the work necessary for the making of catalogues, pamphlets, circulars and other printed matter. Estimates will be furnished for writing the description, making engravings, printing, binding, in fact for the entire job from the beginning to the end or any part of it. Let

us know your needs and we will tell you just exactly what we can do and what it will cost you. A catalogue should be a trade getter—that is the kind we produce. Write to the CATALOGUE BUREAU of THE METAL INDUSTRY, 61 Beekman street, New York.

## METAL MARKET REVIEW

New York, March 13, 1908.

COPPER.—The London copper market has been fairly active during the month of February and prices have followed very closely the fluctuations and sentiments in the American market. Spot G. M. B. opened at £61, advanced to £62, the high point of the month, broke to £56 12s. 6d. and closed at £58, showing a net decline for the month of £3 per ton.

The New York copper market has been weak and steady by turns. The market opened fairly steady, and with the heavy exports of the last two months the statistical position looked good and sound, but there was no home demand, and prices sagged off from 13.25 for Lake at the opening down to 12.50-12.75. During the month the leading selling interests let it be known that many sales had taken place for foreign account and considerable home buying had been placed; this helped to steady the market again and prices were lifted again, but home trade was not stimulated sufficiently to hold the market and prices fell off again. Later in the month the Amalgamated gave out that they had ordered their mines started again and immediately the London prices and the home market weakened and declined. At the close of the month the market looks weak and no one seems to want copper. There has certainly been a better demand for copper this month than since October last and it is perfectly safe and rational to look for a steady improvement. The market to-day is more or less nominal at around 12 to 12½ cents for the different grades from casting to prime Lake. We do not believe much real copper can be picked up at these prices and any signs of the slightest kind of a demand will result in higher prices. Europe will absorb all our surplus copper at around these prices. We have seen this happen before and it is happening now.

The exports for the month were 24,640 tons, against 9,174 tons for the same month last year. The total exports during the last 5 months were 158,517 tons.

TIN.—The price movement of tin in the London market fluctuated above £6 per ton. Spot tin opened at £125 15s. and closed at around £129, showing a net advance for the month of about £4 per ton.

The New York market has ruled fairly firm during the month, owing to the scarcity of spot tin. The month opened with very small supplies, and as we have had a very much better demand buyers have had to pay a heavy premium on all quick shipments.

In our review of the month of January we called attention to just this situation. We said, "spot stocks in America are very small and we may see a squeeze in spot tin before the month is out——"

Spot tin in New York opened at around 27 cents and closed scarce at around 30 cents, while tin in steamers nearby was worth nearly 2 cents per pound less. The market to-day for spot tin f. o. b. New York 5 to 10-ton lots is 29 cents, smaller lots 10 to 15 points higher, later deliveries. March-April delivery can be had at 28.00 to 28.50 cents.

LEAD.—The foreign lead market has eased off slightly during the month with prices at the close about 10s. lower.

The New York lead market has ruled fairly steady all the month at around 3.60 to 3.65 at East St. Louis and 3.65 to 3.75 New York delivery carload lots.

SPELTER.—The foreign spelter market has been firmer during the month and prices advanced about £2 in the formation of a German syndicate of zinc mine owners to control prices. This kind of arrangement is not likely to hold together very long and the American market is not in any way affected.

Spelter in New York and St. Louis has been rather steadier and prices were pushed up about ¼ cent per pound and when market looked strongest all support seemed to be withdrawn and prices dropped to 4½ cents St. Louis, 4.65 New York. The New York market has been rather overbought and carload lots were freely offered delivered in New York at the prices asked in East St. Louis. The market at the close is a shade steadier at 4.60 East St. Louis and 4.70 to 4.75 New York carload lots.

ANTIMONY.—The foreign market has ruled steady all the month with hardly any changes. The foreign price is above the New York market, so that very little trading has been done.

The New York market is dull and quiet, buyers are only interested in their immediate wants and prices are about the same as a month ago. Cookson's around 9 cents, Halletts 8¾ and other grades 8 to 8½ cents.

ALUMINUM.—There has been no change in the price of this metal. Demand is not very active and the present decreased output is more than sufficient for all demands. Prices range from 33 to 35 cents per pound, according to quantity and quality.

SILVER.—The price of this metal has declined nearly 2 cents per ounce and closes to-day around 55 cents in New York and 25¼ in London.

SHEET METALS.—The base price on sheet copper and copper wire have been reduced during the month following the continued dull ingot copper market. The last prices for sheets and wire were based on 15 cents copper and with copper to-day around 12½ cents copper wire has been reduced to 14½ cent base, and sheet copper to 17 cent base. There is a fair demand for sheet copper, but wire is slow.

OLD METALS.—There is nothing encouraging to be said about the old metal market. Most dealers are holding on to their scrap copper for better prices and the consequence is scrap copper, good heavy copper and copper wire are higher in proportion than ingot copper. There has been a good demand for zinc skimmings and ashes, and composition slab zinc dross has been rather firmer in sympathy with a slightly better spelter market.

## THE FEBRUARY MOVEMENTS IN METALS

| | Highest. | Lowest. | Average. |
|---|---|---|---|
| COPPER— | | | |
| Lake | 13.75 | 12.50 | 13.00 |
| Electrolytic | 13.50 | 12.25 | 12.90 |
| Casting | 13.25 | 12.00 | 12.70 |
| TIN | 29.70 | 28.25 | 29.00 |
| LEAD | 3.75 | 3.50 | 3.65 |
| SPELTER | 4.75 | 4.60 | 4.70 |
| ANTIMONY (Hallets) | 9.00 | 8.50 | 8.80 |

## DAILY METAL PRICES

We have made arrangements with the New York Metal Exchange by which we can furnish our readers with the Official Daily Metal Market Reports of the Exchange and a year's subscription to THE METAL INDUSTRY for the sum of $10. The price of the Report alone is $10. Sample copies furnished for the asking. We can also furnish daily telegraphic reports of metal prices.

## ANALYZING AND TESTING BUREAU

THE METAL INDUSTRY is independent of all laboratories, but we offer our services in directing our readers where they can get metals, materials and supplies analyzed and tested to the best advantage. We have an intimate knowledge of the best laboratories in the country and know the specialties of the different ones. Cost for analysis or test furnished on receipt of sample.

## INFORMATION BUREAU

Any concern intending to buy metals, machinery and supplies and desiring the names of the various manufacturers and sellers of these products can obtain this information by writing to THE METAL INDUSTRY. Our Information Bureau is for the purpose of answering questions of all kinds.

**See Advertising Page 21 Following for Trade Wants**

# Metal Prices, March 16, 1908

## NEW METALS.

| | Price per lb. |
|---|---|
| **Copper, Pig, Bar and Ingot and Old Copper.** Duty Free. Manufactured 2½c. per lb. | |
| Lake, car load lots | 12.75 |
| Electrolytic, car load lots | 12.65 |
| Casting, car load lots | 12.25 |
| **Tin**—Duty Free. | |
| Straits of Malacca, car load lots | 29.90 |
| **Lead**—Duty Pigs, Bars and Old 2⅛c. per lb., pipe and sheets 2½c. per lb. | |
| Pig lead, car load lots | 3.90 |
| **Spelter**—Duty 1½c. per lb. | |
| Western, car load lots | 4.75 |
| **Aluminum**—Duty Crude, 8c. per lb. Plates, sheets, bars and rods 13c. per lb. | |
| Small lots | 35.00 |
| 100 lb. lots | 34.00 |
| Ton lots | 33.00 |
| **Antimony**—Duty ¾c. per lb. | |
| Cookson's, cask lots, nominal | 9.00 |
| Halletts, cask lots | 8.75 |
| Other, cask lots | 8.00 |
| **Nickel**—Duty 6c. per lb. | |
| Shot, Plaquettes, Ingots, Blocks, according to quantity | .45 to .60 |
| **Manganese**—Duty 20% | .80 |
| **Magnesium**—Duty Free | $1.40 |
| **Bismuth**—Duty Free | 1.80 |
| **Cadmium**—Duty Free | 1.55 to 1.60 |
| | **Price per oz.** |
| **Gold**—Duty Free | $20.67 |
| **Silver**—Duty Free | .55¾ |
| **Platinum**—Duty Free | 27.00 |
| **Quicksilver**—Duty 7c. per lb. Price per pound | .63c. to 64c. |

## OLD METALS.

| | Price per lb. | |
|---|---|---|
| Heavy Hut Copper | $11.00 | $11.50 |
| Copper Wire | 11.00 | 11.25 |
| Light Copper | 9.25 | 9.75 |
| Heavy Mach. Comp. | 10.00 | 10.25 |
| Heavy Brass | 8.00 | 8.50 |
| Light Brass | 6.00 | 7.00 |
| No. 1 Yellow Brass Turnings | 7.00 | 7.50 |
| No. 1 Comp. Turnings | 8.00 | 9.00 |
| Heavy Lead | 3.00 | 3.25 |
| Zinc Scrap | 3.00 | 3.50 |
| Scrap Aluminum, turnings | 6.50 | 7.00 |
| Scrap Aluminum, cast, alloyed | 16.00 | 18.00 |
| Scrap Aluminum, sheet (new) | 19.00 | 20.00 |
| Old Nickel, solid | 20.00 | 25.00 |
| No. 1 Pewter | 18.00 | 19.00 |

## INGOT METALS.

| | Price per lb. | |
|---|---|---|
| Silicon Copper | according to quantity | 33 to 38 |
| Phosphor Copper, 5% | " " | 19 to 21 |
| Phosphor Copper, 10% to 15% Guaranteed | " " | 28 to 30 |
| Phosphor Tin | " " | 34 to 36 |
| Brass Ingot, Yellow | " " | 10 to 12 |
| Brass Ingot, Red | " " | 12 to 14 |
| Bronze Ingot | " " | 12 to 14 |
| Manganese Bronze | " " | 17 to 19 |
| Phosphor Bronze | " " | 16 to 19 |
| Casting Aluminum Alloys | " " | 29 to 35 |

**Phosphorus**—Duty 18c. per lb.
According to quantity ..... 30 to 40

## PRICES OF HOT ROLLED SHEET COPPER.

| Sizes of Sheets. | 64 oz. and over 50 lb. sheet 30 x 60 and heavier. | 32 oz. to 64 oz. 25 to 50 lbs. sheet 30 x 60. | 24 oz. to 32 oz. 18¾ to 25 lb. sheet 30 x 60. | 16 oz. to 24 oz. 12½ to 18¾ lb. sheet 30 x 60. | 14 oz. and 15 oz. 11 to 12½ lb. sheet 30 x 60. | 12 oz. and 13 oz. 9½ to 11 lb. sheet 30 x 60. | 10 oz. and 11 oz. 7¾ to 9½ lb. sheet 30 x 60. | 8 oz. and 9 oz. 6¼ to 7¾ lb. sheet 30 x 60. | Lighter than 8 oz. |
|---|---|---|---|---|---|---|---|---|---|
| | **Cents per pound.** | | | | | | | | |
| Not wider than 30 ins. — Not longer than 72 inches. | 17 | 17 | 17 | 17 | 18 | 19 | 21 | 23 | 26 |
| Not wider than 30 ins. — Longer than 72 inches. Not longer than 96 inches. | 17 | 17 | 17 | 17 | 18 | 20 | 23 | 26 | |
| Not wider than 30 ins. — Longer than 96 inches. | 17 | 17 | 17 | 17 | 19 | 23 | | | |
| Wider than 30 ins. but not wider than 36 inches. — Not longer than 72 inches. | 17 | 17 | 17 | 17 | 19 | 21 | 24 | 27 | |
| Wider than 30 ins. but not wider than 36 inches. — Longer than 72 inches. Not longer than 96 inches. | 17 | 17 | 17 | 17 | 19 | 23 | 26 | | |
| Wider than 30 ins. but not wider than 36 inches. — Longer than 96 inches. Not longer than 120 inches. | 17 | 17 | 17 | 18 | 20 | | | | |
| Wider than 30 ins. but not wider than 36 inches. — Longer than 120 inches. | 17 | 17 | 18 | 19 | | | | | |
| Wider than 36 ins. but not wider than 48 inches. — Not longer than 72 inches. | 17 | 17 | 18 | 19 | 21 | 24 | 27 | | |
| Wider than 36 ins. but not wider than 48 inches. — Longer than 72 inches. Not longer than 96 inches. | 17 | 17 | 18 | 20 | 22 | 25 | | | |
| Wider than 36 ins. but not wider than 48 inches. — Longer than 96 inches. Not longer than 120 inches. | 17 | 17 | 19 | 21 | 25 | | | | |
| Wider than 36 ins. but not wider than 48 inches. — Longer than 120 inches. | 17 | 18 | 20 | 23 | | | | | |
| Wider than 48 ins. but not wider than 60 inches. — Not longer than 72 inches. | 17 | 17 | 18 | 20 | 23 | 28 | | | |
| Wider than 48 ins. but not wider than 60 inches. — Longer than 72 inches. Not longer than 96 inches. | 17 | 17 | 19 | 21 | 26 | | | | |
| Wider than 48 ins. but not wider than 60 inches. — Longer than 96 inches. Not longer than 120 inches. | 17 | 18 | 20 | 23 | | | | | |
| Wider than 48 ins. but not wider than 60 inches. — Longer than 120 inches. | 18 | 19 | 21 | 25 | | | | | |
| Wider than 60 ins. but not wider than 72 ins. — Not longer than 96 inches. | 17 | 18 | 20 | 25 | | | | | |
| Wider than 60 ins. but not wider than 72 ins. — Longer than 96 inches. Not longer than 120 inches. | 17 | 19 | 22 | 27 | | | | | |
| Wider than 60 ins. but not wider than 72 ins. — Longer than 120 inches. | 18 | 20 | 25 | | | | | | |
| Wider than 72 ins. but not wider than 108 ins. — Not longer than 96 inches. | 18 | 20 | 23 | | | | | | |
| Wider than 72 ins. but not wider than 108 ins. — Longer than 96 inches. Not longer than 120 inches. | 19 | 21 | 24 | | | | | | |
| Wider than 72 ins. but not wider than 108 ins. — Longer than 120 inches. | 20 | 22 | 26 | | | | | | |
| Wider than 108 ins. — Not longer than 132 inches. | 21 | 23 | | | | | | | |
| Wider than 108 ins. — Longer than 132 inches | 22 | 25 | | | | | | | |

Rolled Round Copper, ⅜ inch diameter or over 17 cents per pound. (Cold Drawn, Square and Special Shapes, extra.)

Circles, Segments and Pattern Sheets three (3) cents per pound advance over prices of Sheet Copper required to cut them from.

All Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, one (1) cent per pound over the foregoing prices.

All Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, two (2) cents per pound over the foregoing prices.

Cold Rolled and Annealed Copper, Sheets and Circles, take the same price as Cold or Hard Rolled Copper of corresponding dimensions and thickness.

All Polished Copper, 20 inches wide and under, one (1) cent per pound advance over the price for Cold Rolled Copper.

All Polished Copper, over 20 inches wide, two (2) cents per pound advance over the price for Cold Rolled Copper.

Planished Copper, one (1) cent per pound more than Polished Copper.

Cold Rolled Copper prepared suitable for polishing, same prices and extras as Polished Copper.

Tinning Sheets, on one side, 3½c. per square foot.

For tinning both sides, double the above price.

For tinning the edge of sheets, one or both sides, price shall be the same as for tinning all of one side of the specified sheet.

## COPPER BOTTOMS, PITS AND FLATS.

| | |
|---|---|
| 14 oz. to square foot and heavier, per lb. | 21c. |
| 12 oz. and up to 14 oz. to square foot, per lb. | 22c. |
| 10 oz. and up to 12 oz. | 24c. |
| Lighter than 10 oz. | 27c. |

Circles less than 8 in. dia., 2c. per lb. additional.
Circles over 13 in. dia. are classed as Copper Bottoms.
Polished Copper Bottoms and Flats, 1c. per lb. extra.

| Zinc—Duty, sheet, 2c. per lb. | Price per lb. |
|---|---|
| 600 lb. casks | 7.50 |
| Open casks | 8.00 |

# Metal Prices, March 16, 1908

## PRICES ON BRASS MATERIAL—MILL SHIPMENTS.

**In effect Feb. 24th, 1908, and until further notice.**

To customers who purchase less than 5,000 lbs. per month and over 5,000 lbs. per year.

| | Net base per lb. High Brass. | Low Brass. | Bronze. |
|---|---|---|---|
| Sheet | $0.13¼ | $0.15¼ | $0.17 |
| Wire ¼" and larger | .13½ | .15½ | .17¼ |
| Wire smaller than ¼" to No. 8 inclusive | .14¼ | .16¼ | .18 |
| Wire smaller than No. 8 to No. 10, inclusive | .14¾ | .16¾ | .18½ |
| Rods ¼" and larger to ½" diameter | .13¾ | .15¾ | .18½ |
| Rods ½" to 1" diameter, both inclusive | .13½ | .15½ | .18¼ |
| Brazed tubing | .19¾ | — | .22 |
| Open seam tubing | .17¾ | — | .20 |
| Angle and channel, plain | .19¾ | — | .23¼ |

30% discount from all extras except for quality.

**NET EXTRAS FOR QUALITY.**

| | | | | | |
|---|---|---|---|---|---|
| Sheet—Extra spring, drawing and spinning brass | ½c. | per | lb. | net | advance. |
| " —Best spring, drawing and spinning brass | 1½c. | " | " | " | " |
| Wire—Extra spring and brasing brass wire | ½c. | " | " | " | " |
| " —Best spring and brasing brass wire | 1c. | " | " | " | " |

To customers who purchase less than 5,000 lbs per year.

| | Net base per lb. High Brass. | Low Brass. | Bronze. |
|---|---|---|---|
| Sheet | $0.14¼ | $0.16¼ | $0.18 |
| Wire ¼" and larger | .14½ | .16½ | .18¼ |
| Wire smaller than ¼" to No. 8 inclusive | .15¼ | .17¼ | .19 |
| Wire smaller than No. 8 to No. 10 inclusive | .15¾ | .17¾ | .19½ |
| Rods ¼" and larger to ½" diameter | .14¾ | .16¾ | .19½ |
| Rods ½" to 1" diameter, both inclusive | .14½ | .16½ | .19¼ |
| Brazed tubing | .20¾ | — | .23 |
| Open seam tubing | .18¾ | — | .21 |
| Angle and channel, plain | .20¾ | — | .24¼ |

5% discount from all extras except for quality.

**NET EXTRAS FOR QUALITY.**

Same as above.

## BARE COPPER WIRE—CARLOAD LOTS.

14½c. per lb. base.

## SOLDERING COPPERS.

| | | | | |
|---|---|---|---|---|
| 300 lbs. and over in one order | 19c. | per | lb. | base |
| 100 lbs. to 300 lbs. in one order | 19½c. | " | " | " |
| Less than 100 lbs. in one order | 21c. | " | " | " |

## PRICES FOR SEAMLESS BRASS TUBING.

From 1¼ to 3½ in. O. D. Nos. 4 to 13 Stubs' Gauge, 20c. per lb.
Seamless Copper Tubing, 21c. per lb.

**For other sizes see Manufacturers' List.**

## PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

| Iron Pipe Size. | ⅛ | ¼ | ⅜ | ½ | ¾ | 1 | 1¼ | 1½ | 2 | 2½ | 3 | 3½ | 4 | 4½ | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Price per lb. | 26 | 25 | 20 | 19 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 19 | 20 | 22 | 24 | 25 |

## PRICE LIST OF IRON LINED TUBING—NOT POLISHED.

| | Per 100 feet Brass. | Bronze. |
|---|---|---|
| ⅜ inch | $8 | $9 |
| ½ inch | 8 | 9 |
| ⅝ inch | 10 | 11 |
| ¾ inch | 12 | 13 |
| ⅞ inch | 14 | 15 |
| 1 inch | 18 | 20 |
| 1¼ inch | 22 | 24 |
| 1½ inch | 25 | 27 |
| 1½ inch | 32 | 35 |
| 1¾ inch | 45 | 48 |
| 2 inch | 56 | 60 |

Discount 45 and 5%.

## PRICES FOR MUNTZ METAL AND TOBIN BRONZE.

| | | | | |
|---|---|---|---|---|
| Muntz or Yellow Metal Sheathing (14" x 48") | 14c. | lb. | net | base |
| " " " Rectangular Sheets other than Sheathing | 16c. | " | " | " |
| " " " Rod | 15c. | " | " | " |
| Tobin Bronze Rod | 17c. | " | " | " |

Above are for 100 lbs. or more in one order.

## PLATERS' METALS.

Platers' bars in the rough, 22½c. net.

German silver platers' bars dependent on the percentage of nickel, quantity and general character of the order.

Platers' metal, so called, is very thin metal not made by the larger mills and for which prices are quoted on application to the manufacturers.

## PRICES FOR SHEET BLOCK TIN AND BRITANNIA METAL.

Not over 18 in. in width, not thinner than 23 B. S. Gauge, 4c. above price of pig tin in same quality.

Not over 35 in. in width, not thinner than 22 B. S. Gauge, 5c. above price of pig tin.

## PRICE LIST FOR SHEET ALUMINUM—B. & S. Gauge.

| Wider than..... and including.... | 3in. 12in. in coils. | 6in. 14in. | 14in. 16in. | 16in. 18in. | 18in. 20in. | 20in. 24in. | 24in. 30in. | 30in. 36in. | 36in. 40in. |
|---|---|---|---|---|---|---|---|---|---|
| No. 13 and heavier | 40 | 40 | 42 | 42 | 42 | 42 | 45 | 45 | 45 |
| " 14 | 40 | 40 | 42 | 42 | 42 | 42 | 45 | 45 | 45 |
| " 15 | 40 | 40 | 42 | 42 | 42 | 42 | 45 | 45 | 45 |
| " 16 | 40 | 40 | 42 | 42 | 42 | 42 | 45 | 45 | 45 |
| " 17 | 40 | 40 | 42 | 42 | 42 | 42 | 45 | 45 | 45 |
| " 18 | 40 | 40 | 42 | 42 | 42 | 42 | 45 | 45 | 48 |
| " 19 | 40 | 40 | 42 | 42 | 42 | 42 | 45 | 46 | 49 |
| " 20 | 40 | 42 | 42 | 42 | 42 | 44 | 47 | 48 | 50 |
| " 21 | 40 | 44 | 44 | 44 | 44 | 46 | 49 | 50 | 56 |
| " 22 | 40 | 44 | 44 | 44 | 46 | 46 | 49 | 53 | 57 |
| " 23 | 40 | 44 | 44 | 44 | 46 | 46 | 49 | 55 | 58 |
| " 24 | 40 | 44 | 46 | 48 | 48 | 48 | 51 | 57 | 60 |
| " 25 | 42 | 45 | 47 | 49 | 49 | 49 | 52 | 59 | 63 |
| " 26 | 42 | 45 | 48 | 52 | 52 | 52 | 57 | 61 | 67 |
| " 27 | 42 | 46 | 50 | 54 | 54 | 55 | 60 | 64 | 70 |
| " 28 | 42 | 46 | 52 | 54 | 55 | 55 | 62 | 68 | 73 |
| " 29 | 44 | 47 | 54 | 56 | 58 | 58 | 67 | 73 | 78 |
| " 30 | 44 | 48 | 56 | 58 | 62 | 68 | 76 | 78 | 83 |
| " 31 | 49 | 53 | 61 | 64 | 69 | 77 | 80 | 83 | 89 |
| " 32 | 51 | 55 | 63 | 67 | 75 | 83 | 90 | 96 | 101 |
| " 33 | 53 | 57 | 66 | 71 | 79 | 90 | 97 | 106 | 116 |
| " 34 | 56 | 61 | 68 | 76 | 84 | 97 | 109 | 116 | 126 |
| " 35 | .. | 71 | 76 | 86 | 96 | 106 | 121 | 131 | .. |
| " 36 | .. | 86 | 96 | 106 | 121 | 126 | 141 | .. | .. |
| " 37 | .. | 110 | 114 | 135 | 150 | 165 | 180 | .. | .. |
| " 38 | .. | 130 | 145 | 160 | 175 | 190 | 210 | .. | .. |
| " 39 | .. | 150 | 170 | 190 | 210 | 230 | .. | .. | .. |
| " 40 | .. | 180 | 210 | 230 | 250 | .. | .. | .. | .. |

In flat rolled sheets the above prices refer to lengths between 2 and 8 feet. Prices furnished by the manufacturers for wider and narrower sheet. All columns except the first refer to flat rolled sheet. Prices are for 50 lbs. or more at one time. Less quantities 5c. lb. extra. Charges made for boxing.

## PRICE LIST OF SEAMLESS ALUMINUM TUBING.

| Stubs' G. | B. & S. G. | 1¼" | 1½" | 1¾" | 2" | 2¼" | 2½" | 2¾" | 3" | 3¼" | 3½" | 3¾" | 4" | 4¼" | 4½" |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 to 11 | 3 to 9 | BASE PRICE 50 CENTS. | | | | | | | | | | 3 | 3 | 3 | 10 |
| 12 | 10 | | | | | | | | | | | 6 | 6 | 6 | 13 |
| 13 | 11 | | | | | | | | | | | 10 | 10 | 10 | 16 |
| 14 | 12 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 13 | 13 | 13 | 19 |
| 15 | 13 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 19 | 19 | 19 | 22 |
| 16 | 14 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 16 | 19 | 22 | 25 | 35 |
| 17 | 15 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 16 | 19 | 22 | 25 | 29 | 38 |
| 18 | 16 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 19 | 22 | 25 | 29 | 32 | 35 | 44 |
| 19 | 17 | 16 | 16 | 16 | 16 | 16 | 22 | 25 | 29 | 32 | 35 | 41 | 48 | 54 | 54 |
| 20 | 18-19 | 19 | 19 | 19 | 19 | 19 | 22 | 22 | 25 | 29 | 35 | 35 | 41 | 60 | 60 |
| 21 | 20 | 22 | 22 | 22 | 22 | 22 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 22 | 21 | 25 | 25 | 25 | 25 | 25 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 23 | 22 | 35 | 35 | 35 | 41 | 48 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 24 | 23 | 57 | 60 | 60 | 63 | 67 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 25 | 24 | 73 | 76 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |

Prices are for ten pounds or more at a time. For prices on smaller sizes send for manufacturers' list.

## PRICE LIST FOR ALUMINUM ROD AND WIRE.

| Diameter B. & S. G'ge. | 000 to No. 10. | No. 11. | No. 12. | No. 13. | No. 14. | No. 15. | No. 16. | No. 17. | No. 18. | No. 19. | No. 20. | No. 21. | No. 22. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Price, per lb.... | 38 | 38½ | 38½ | 39 | 39½ | 40 | 40½ | 41 | 42 | 43 | 44 | 47 | 52 |

200 lbs. to 30,000 lbs., 3 cents off list; 30,000 lbs. and over, 4 cents off list.

## PRICE LIST FOR GERMAN SILVER IN SHEETS AND ROLLS.

| Per cent. | Price per lb. | Per cent. | Price per lb. |
|---|---|---|---|
| 12 | $0.52 | 16 | $0.58 |
| 13 | .53 | 17 | .59 |
| 14 | .54 | 18 | .60 |
| 15 | .55 | | |

These prices are for sheets and rolls over 2 inches in width, to and including 8 inches in width and to No. 20, inclusive, American or Brown & Sharpe's Gauge. Prices are for 100 lbs. or more of one size and gauge in one order. Discount 50%.

## GERMAN SILVER TUBING.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4 | per cent. | to | No. 19, | B. & S. | Gauge, | inclusive | $0.60 |
| 6 | " | " | 19, | " | " | " | .70 |
| 9 | " | " | 19, | " | " | " | .85 |
| 12 | " | " | 19, | " | " | " | 1.00 |
| 15 | " | " | 19, | " | " | " | 1.15 |
| 16 | " | " | 19, | " | " | " | 1.20 |
| 18 | " | " | 19, | " | " | " | 1.30 |

German Silver Tubing thinner than No. 19 B. & S. Gauge add same advances as for Brazed Brass Tube.

For cutting to special lengths add same advances as for Brazed Brass Tube. Discount 40%.

## PRICE OF SHEET SILVER.

Roller sterling silver .925 fine is sold according to gauge quantity and market conditions. No fixed quotations can be given as prices range from 2c. below to 6c. above the price of bullion.

Rolled silver anodes .999 fine are quoted at 2c. above the price of bullion.

# TRADE WANTS

**AN EXCHANGE FOR THE WANTS OF THE METAL TRADES.**

Advertisements will be inserted under this head at 40 cents per line, 3 lines one dollar, for each insertion, excepting Situations Wanted, 20 cents per line, 3 lines half a dollar. Answers sent in our care will be forwarded.

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**We have for sale the following**

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FOR SALE—First-class job shop, manufacturing gold and silver plating and fine repairing. Good business. For location and particulars address A. I. HALL, ROCHESTER, N. H.

FOR SALE—Complete Electro-Plating Plant for Brass, Copper and Nickel. Engine, Dynamo, Tanks, Scratching, Buffing and Polishing Machines with brushes. Solutions, anodes, etc. Will sell cheap. For further particulars address THE H. S. DOWDEN COMPANY, SANDWICH, MASS.

FOR SALE—POLISHING AND PLATING OUTFIT COMPLETE. For particulars address DELAWARE PLATING COMPANY, 517 East Third street, Wilmington, Del.

FOR SALE—BRASS FOUNDRY IN GOOD LOCATION. Has a steady run of orders. Good chance for practical man. Address F-1, care THE METAL INDUSTRY.

FOR SALE—AT A SACRIFICE, A BRICK FOUNDRY FACTORY with all of the machinery for smelting. Located at Utica, N. Y. For further information inquire of SAMUEL ELLIS, 322 Canal street, New York City.

FOR SALE—THE COLUMBIA HAND PROTECTOR. A device which saves the fingers of pattern makers and avoids accidents. Further particulars furnished for the asking. Address F-2, care THE METAL INDUSTRY.

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WANTED—CONCERNS HANDLING PLATERS' AND POLISHERS' SUPPLIES to represent a large manufacturer of alkalies. Address ALKALI, F-7, care THE METAL INDUSTRY.

WANTED—AGENCY OF MANUFACTURERS IN METAL WARE of standard reputation who desire to be represented by New York agent for export and local trade. Address DOMESTIC AND FOREIGN, F-8, care THE METAL INDUSTRY.

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SITUATION WANTED by a man with 12 years' experience as a METAL ROLLER in four different Brass Rolling Mills. Address METAL ROLLER, care THE METAL INDUSTRY.

SITUATION WANTED—A position either in the manufacturing line or traveling representative of a manufacturing firm. Have filled a position as General Superintendent in the manufacture of high grade automobiles for the past nine years. A thorough practical man in all lines of its manufacture. Address PRACTICAL, care THE METAL INDUSTRY.

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SITUATION WANTED—By ELECTRO-PLATER with up-to-date methods, resulting in extreme economy as to labor and superior finish. Would like to take position at once, can demonstrate and give satisfactory reference. Address ELECTRO-PLATER, care THE METAL INDUSTRY.

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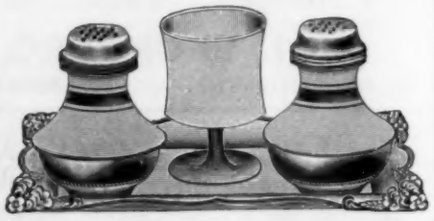

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General Chemical Co., Philadelphia, Pa.
Hanson & Van Winkle Co., Newark, N. J., and Chicago, Ill.
Illinois Zinc Co., Peru, Ill.
International Chemical Co., Camden, N. J.
Kemp, W. H., Co., New York.
L'Hommedieu, C. F., Sons Co., Chicago, Ill.
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
New Jersey Zinc Co., New York.
Sandoval Zinc Co., Chicago, Ill.
Stevens, F. B., Detroit, Mich.
U. S. Chemical Co., Cleveland, O.
Zucker & Levett & Loeb Co., New York.

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Obermayer, S., Co., Cincinnati, O.

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Paige Retort & Crucible Co., Taunton, Mass.
Richards & Co., Boston, Mass.
Ross-Tacony Crucible Co., Philadelphia, Pa.
Seidel, R. B., Inc., Philadelphia, Pa.
Taylor, R. J., Inc., Philadelphia, Pa.
Waterbury Crucible Co., Waterbury, Conn.

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The Hoskins Co., Chicago, Ill.

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Obermayer, S., Co., Cincinnati, O.
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Stevens, F. B., Detroit, Mich.

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Zucker & Levett & Loeb Co., New York.

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Hanson & Van Winkle Co., Newark, N. J.
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Venderbush & Looman, Detroit, Mich.
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The Hoskins Co., Chicago, Ill.

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Nikolas, G. J., & Co., Chicago, Ill.

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Bates & Peard Annealing Furnace Co., New York.
Bliss, E. W., Co., Brooklyn, N. Y.
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Moussette, O. J., Brooklyn, N. Y.
Otto Gas Engine Works, Phila., Pa.
Philadelphia Roll and Machine Company, Philadelphia.
Shuster, F. B., & Co., New Haven, Conn.
Torrington Mfg. Co., Torrington, Conn.
Turner Machine Co., Philadelphia, Pa.
Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.
Watson-Stillman Co., New York.

**MAGNETIC METAL SEPARATORS.**
Capitol Brass Works, Detroit, Mich.
Dings Electro-Magnetic Separator Co., Milwaukee, Wis.
Parsons, R., & Co., Philadelphia, Pa.
Paxson, J. W., Co., Philadelphia, Pa.

**METAL MELTING FURNACES.**
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Monarch Eng. and Mfg. Co., Baltimore, Md.
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Crescent Phosphorized Metal Co., Philada, Pa.
Culbert Co., J. C., Pawtucket, R. I.
Eagle Smelting & Refining Works, New York.
Electric Smelting & Aluminum Co., Lockport, N. Y.
Globe Metal Co., Chicago, Ill.
Hagstoz, T. B., Co., Philadelphia, Pa.
Hazard, Coates & Bennett Co., Rochester, N. Y.
Hofeller, Theo., & Co., Buffalo, N. Y.
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Smith, M. B., Co., New York.
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Sterling Smelting Co., Brooklyn, N. Y.
Syracuse Smelting Wks., Syracuse, N. Y.
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White & Bro., Philadelphia, Pa.

**METALS—SHEET, ROD, WIRE AND TUBING.**
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Ivins Ellwood Tube Works, Phila., Pa.
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National Sheet Metal Co., Peru, Ill.
Phenix Tube Co., Brooklyn, N. Y.
Phosphor-Bronze Smelting Co., Ltd., Philadelphia, Pa.
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Two Qualities 10 or 15% Phosphorus Guaranteed
¶ This deoxidizer has been thoroughly tested and pronounced A1.
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The Metal Industry BOOKS
On Metals
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# OUR BUSINESS FORECAST FOR 1908

## THE "STEELE HARVEY"
## CRUCIBLE BRASS MELTING FURNACE

Thanks its many users for their acquaintanceship for 1907 and trusts to be installed on "TRIAL AND APPROVAL" during 1908 to a "FOUR FOLD" extent over 1907.

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Look up, look ahead! Remember profits of 1907. Don't regard temporary conditions. Be liberal. Appropriate portion of profits for modernizing Foundry Department. Your competitors may be equipped with modern Melting Furnaces. Therefore, as metals are lower in price than 1907, profit is reduced in proportion. You are therefore compelled to meet conditions by reducing cost by **50%** over COKE methods.

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**THE "STEELE-HARVEY" CRUCIBLE TILTING FURNACE**
**or "MONARCH" REMOVABLE CRUCIBLE FURNACE**

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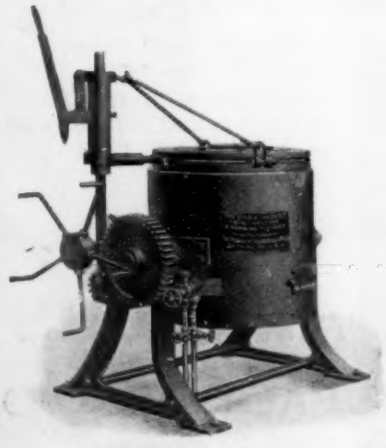
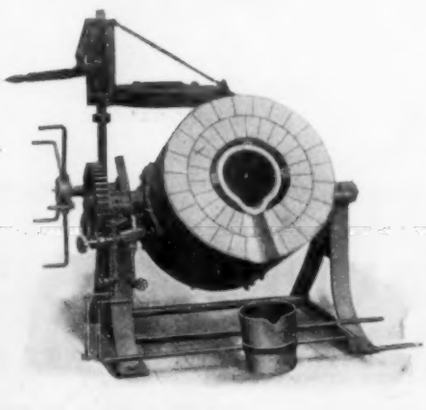


Melting Position.



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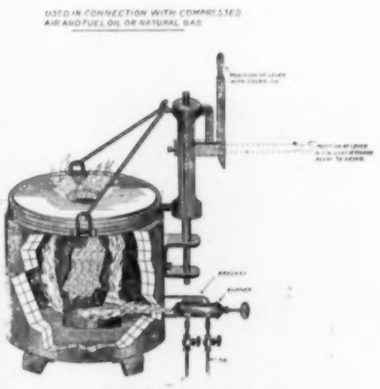



Non-Tilting Furnace.

We send demonstrator to instruct within reasonable distance. Will enter orders for "complete equipment," quote satisfactory prices and arrange payments by check with liberal cash allowance or note settlement to your satisfaction.

QUICK SHIPMENTS GUARANTEED IF INTERESTED, WRITE FOR "CATALOGUE"

## THE MONARCH ENGINEERING AND MANUFACTURING CO.

**Works, Curtis Bay, Md.** **BALTIMORE, MD., U. S. A.**

REPRESENTATIVES

CARR & SPEER, 120 Liberty St., New York.
A. L. TAYLOR CO., 9 California St., San Francisco.
J. W. JACKMAN & CO., Caxton House, London, England.

# Brass Foundry Supplies

## FORCED and NATURAL DRAFT FURNACES and MAGNETIC SEPARATORS, etc., etc.

**Furnaces for every purpose**

Catalogues ? Sure !

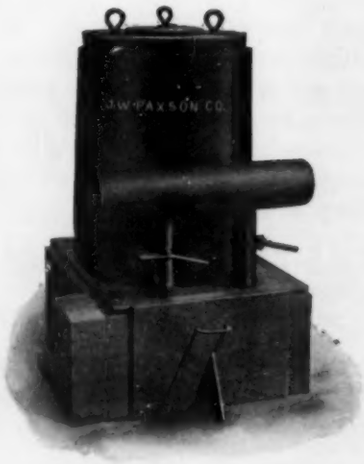



Fig. 621
Forced Draft Furnace

Fig. 622
Natural Draft Furnace
"SQUARE"

Fig. 623
Natural Draft Furnace
"ROUND"
Also made with drop-grate, and with closed bottom to be used with forced draft

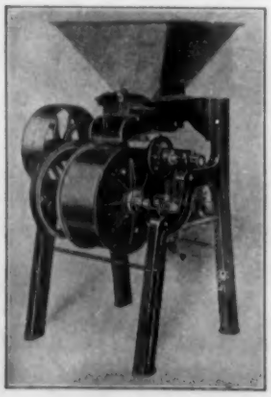


Fig. 76
The Paxson-Sawyer Magnetic Separator

## MAGNETIC SEPARATORS

WE ARE NOW MANUFACTURING THESE SEPARATORS FOR SEPARATING METAL TURNINGS

HAND OR BELT DRIVEN

## J. W. PAXSON CO., PHILADELPHIA

# BASSITE

## An alloy designed to take the place of Tin in the manufacture of Brass Castings

FOR THE EXPRESS PURPOSE OF

First—Reducing the outlay represented by the cost of Tin requirements in the Brass Foundry.

Second—Producing a metal which may be poured at a high temperature, if necessary, yet without danger of porous or defective castings resulting thereby.

Third—Permitting castings to be finished with greater speed and ease, yet giving the tensile strength, general qualities and color represented by the usual run of Brass castings made with Tin Alloy.

**Bassite Saves the Brass Founder**

- Fully 33⅓% of the usual outlay for Tin.
- 10 to 30% upon the cost of finishing castings.
- 25% of the expense for tools, as Bassite castings occasion but little wear on tools.

Trial orders for 100 lbs. will be accepted with the understanding that the metal will be given thorough and impartial trial in the foundry, putting the purchaser under no obligation to pay for the same if not found to substantiate the above statements.

## BASSITE MINING & SMELTING COMPANY

COMMERCIAL TRIBUNE BUILDING CINCINNATI, OHIO, U. S. A.

**Preparing for Prosperity.**

PHILADELPHIA, March 28.—In anticipation of an early return of prosperity an order for $500,000 worth of equipment will be placed by the Lehigh and New England Railroad Company within a few days. It will call for 250 coal and 250 freight cars and three locomotives, being the largest order ever placed by this road.

**PLAIN TRUTH**

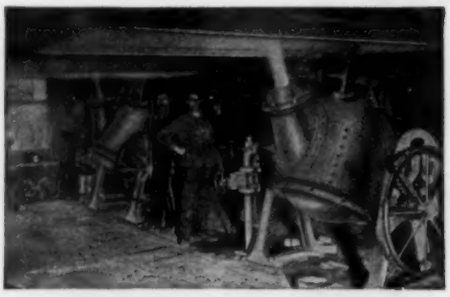
# PREPARE FOR PROSPERITY ORDER ROCKWELL FURNACES NOW

**FULL TIME FOR 10,000 ELECTRIC WORKERS.**

SCHENECTADY, March 23.—The ten thousand employees of the General Electric Company, in this city, who have been working four days a week for two months, will shortly go on full time as a result of the large orders recently secured.

We feel that now is the time to make your improvements and we will be pleased to figure on any furnace equipment you may require. Nothing too large; nothing too small—for us. Write for complete catalogue of melting furnaces.

**ROCKWELL ENGINEERING CO., 25 Dey Street, New York**



Corner of Foundry, Westinghouse Electric and Manufacturing Co., East Pittsburg, Pa., 9 Schwartz Furnaces in Operation.

# Economy in Melting

The Hawley (Schwartz) furnace is, in reality, the keystone of the entire metal industry as to the design of the furnace and its availability in regard to economy in fuel consumption, economy in heat consumption, efficiency of heat utilization, and economy of metal shrinkage.

Therefore, you are able to realize the necessary conditions of practical metallurgy as experience has proved in practical work of many years.

Large, medium, and small castings can be made with facility that will meet the various physical and chemical requirements of the trade.

**Send for Catalogue M**

**HAWLEY DOWN DRAFT FURNACE CO.**

**Main Offices and Works: Superior and Townsend Streets, CHICAGO**

**Eastern Office: 149 Broadway, NEW YORK**

# THE LATEST AND BEST

**Improved Portable Core Oven**

**PATENTED**

**More Shelf Room. No Escape of Heat in Loading or Unloading. Economical in Fuel. Practical in All Respects.**

*Send for further particulars*

**SOLE MANUFACTURERS**

**THE HILL & GRIFFITH CO., Cincinnati, Ohio, U. S. A.**

*Also Manufacturers of Graphite, Plumbago, Foundry Supplies and Equipments.*

# Don't Experiment

When you pay out your good, hard-earned dollars for foundry facings and supplies you want to know what you are getting. So then, it's best to

## Buy from the house of experience

in other words, the S. Obermayer Co. We have done all the experimenting for you and now offer you the perfected products of 34 years' experience.

**Get our Catalog 2-X and see**

EVERYTHING YOU NEED IN YOUR FOUNDRY

***The* S. Obermayer Co.**

**CINCINNATI CHICAGO PITTSBURG**

**Canadian Agents**

**DOMINION FOUNDRY SUPPLY CO., TORONTO AND MONTREAL**

# Do You Use Lycopodium?
# Do You Use Parting Composition?

If you do, you will be interested in our EUREKA PARTING. It weighs 18¾% more than Lycopodium and about 90% less than standard partings, bulk for bulk. The price, bulk for bulk, is half of any parting composition on the market, Lycopodium included.

It is non-explosive, as is Lycopodium, and will do anything that can be done with Lycopodium. It is similar in color to Lycopodium, allowing of readily seeing the parting.

Sample and price on application, stating quantity desired.

## The Detroit Foundry Supply Co.

Windsor, Ont.
Canadian Plant

FACING
FIRE BRICK
FOUNDRY SUPPLIES
FOUNDRY EQUIPMENT

Facing Mill
Detroit, Mich.

WE ARE DISTRIBUTING AGENTS FOR GLUTRIN

ROBERT J. TAYLOR INCORPORATED.

## TAYLOR CRUCIBLES

*For Years the Recognized Standard for Uniform Service*

IF INTERESTED WRITE US

ROBERT J. TAYLOR, INCORPORATED

*1900 to 1916 Callowhill Street* — *PHILADELPHIA, PA.*

## THE WATERBURY CRUCIBLE CO.

WATERBURY, CONN., U. S. A.

London Office - - - - - - - - 28 Victoria Street

# ROSS-TACONY CRUCIBLE CO.

**TACONY, PHILA., PA.**

*HIGHEST GRADE ON THE MARKET*

*Why not try these superior goods*

**ROSS-TACONY CRUCIBLE CO.**

It is a fact that of the SEVEN well known Crucible Companies in America only THREE of these Companies make their crucibles of a quality that comes up to the standard demanded by the

## MAJORITY of Users of CRUCIBLES

There is a demand for a BETTER Crucible AT ALL TIMES if it CAN BE MADE

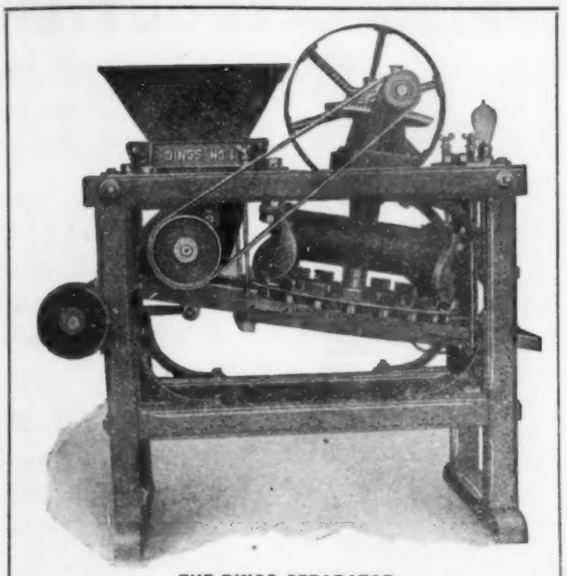
With the LATEST IMPROVED MACHINERY, with careful work by EXPERIENCED workmen, looking to quality before quantity in our product, we can meet this demand with a better pot than has ever been placed on the market.

TRY OUR CRUCIBLES DURING 1908

**PAIGE RETORT AND CRUCIBLE CO.**

**E. D. PAIGE, Treasurer** **TAUNTON, MASS.**

# MAGNETIC SEPARATORS



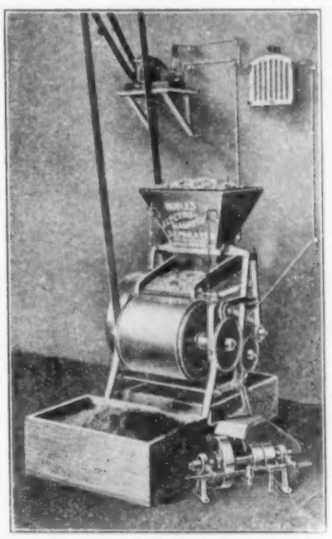
THE DINGS SEPARATOR

DIFFERENT KINDS AND SIZES MADE
TO SUIT ANY REQUIREMENTS

**DINGS ELECTRO-MAGNETIC SEPARATOR CO.** MILWAUKEE, WIS.

# NOBLE'S ELECTRO-MAGNETIC METAL SEPARATOR

MOST PRACTICAL, EFFICIENT AND ECONOMICAL



For **BRASS FOUNDERS** and all other purposes requiring the separation from Magnetic Metals.

Orders solicited subject to approval after 30 days' trial.

WRITE FOR CATALOGUE M AND PRICES.

**CAPITOL BRASS WORKS, - Detroit, Mich.**

# Dixon Crucibles

## The Kind That Last

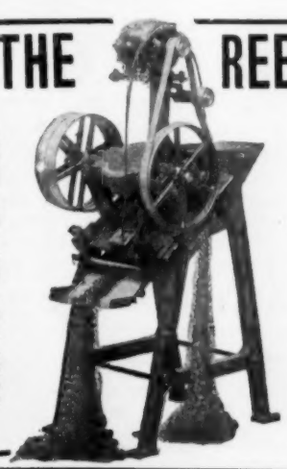
When proper care accompanies the use of Dixon's Crucibles they will be always found to give the very best of service. If you do not know just how good these crucibles are, you should try them at once.

Write for new, handsome crucible booklet 12-A.

**JOSEPH DIXON CRUCIBLE COMPANY**
JERSEY CITY
N. J., U. S. A.

# THE REED MAGNETIC Metal Separator

JUST PUT ON THE BELT



Will do more work and better work than any other.

**Efficient, Simple, Cheap**

Metal Separators built to meet all requirements.

**Special Machinery, Dies, Metal Stamping.**

**R. PARSONS CO.**
**23d & Hamilton Sts.,**
**PHILADELPHIA PA.**

# Crucibles.

**All sizes and for all purposes.**

No. 0 to No. **400.**

Established 1866.

**R. B. SEIDEL, Inc.**

**Philadelphia Black Lead Crucible Works,**

**1322-34 Callowhill Street, PHILADELPHIA**

# YOU MUST TRIM
THE SPRUES FROM
# YOUR CASTINGS

What you need is a SHUSTER FOOT LEVER or POWER SPRUE CUTTER. Soon pays for itself in time and labor.

They do the work quick and easy, making the cuts so clean and close that castings trimmed in this way seldom need grinding.

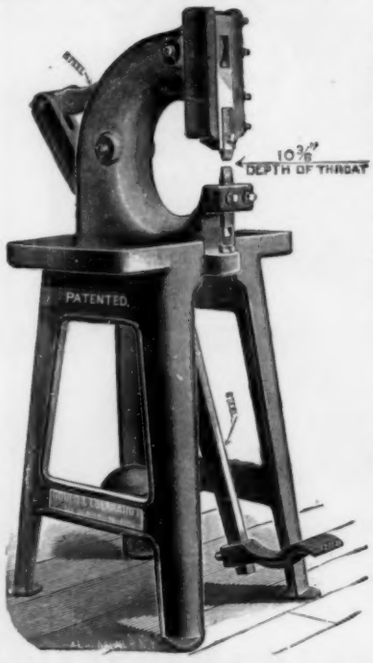
You can't afford to be without one. Lasts a lifetime.

Do you ever have occasion to use wire, straightened and cut into certain lengths? Or have any riveting to do?

For description and prices write

## THE F. B. SHUSTER CO.
Formerly JOHN ADT & SON,
**NEW HAVEN, CONN.**

# TURNER PATENT SPRUE OR GATE CUTTER




is strong and rigid, therefore durable.

Good for light and heavy work; plenty of room for all sizes of castings.

Good adjustment, good frame, all necessary requisites.

Made only in one size.

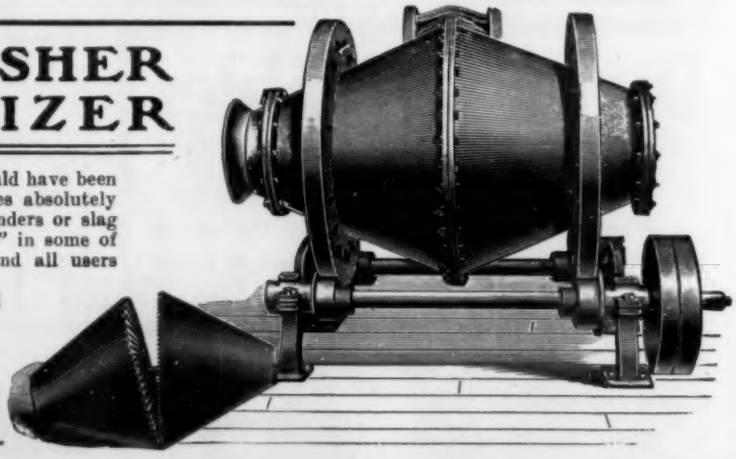
Send for Circulars

**TURNER MACHINE COMPANY**
2049 N. SECOND ST., PHILADELPHIA, PA.

# MONARCH CRUSHER AND PULVERIZER

Many a dollar has been lost in the foundry that could have been saved had "The Monarch" been in operation. It does absolutely and thoroughly reclaim the metal from the ashes, cinders or slag of brass furnaces. We have installed "The Monarch" in some of the leading brass foundries and smelting works, and all users advise that this machine is giving satisfaction.

It is surely a great money and labor saver and you should know about it.



**O. J. MOUSSETTE, Manufacturer**
Tools, Dies, Presses and Special Machinery
Driggs Ave., cor. North 10th Street, BROOKLYN, N. Y.

# MAHOGANY FOR PATTERN WORK

¶ Try our special pattern grade. Costing no more than White Pine. Makes a durable pattern and easy to work.

**LEWIS THOMPSON & CO., Inc.,**
18th and Indiana Avenue, **PHILADELPHIA**

# FIRE BRICK

Highest grades of basic brick and special shapes for lining metallurgical furnaces

Sole manufacturers of the

**New Basic Bauxite Brick**

Especially adapted to metallurgical work. Write us about your furnace lining troubles and for catalogue.

**LACLEDE-CHRISTY CLAY PRODUCTS CO.**
**ST. LOUIS, MO.**

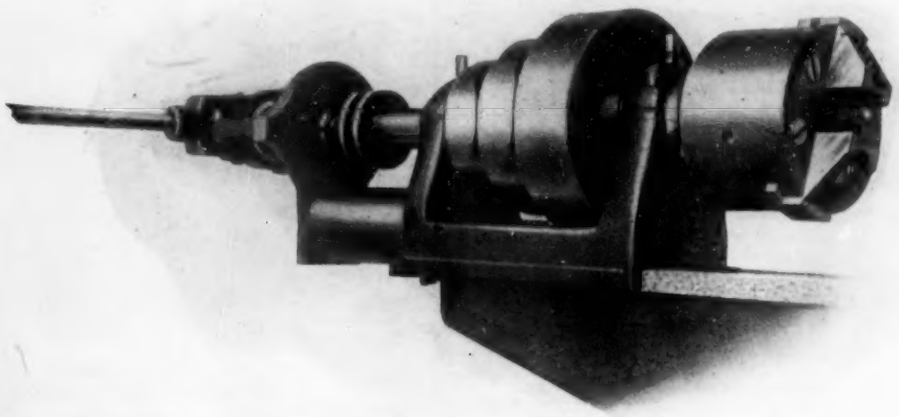
## HAVE YOU SEEN THE

# MANUFACTURING CHUCK?

### For Monitor and Chucking Lathes

(Patented—Other Patents Pending)

**The best and only automatic two-jawed chuck on the market. It has no equal for rapidity, accuracy, general efficiency, durability and simplicity.**
**Increase in output, 100 per cent. and more.**
**Its numerous and striking advantages will be recognized at once by every practical man.**



This latest chucking device merits the mechanical world's approval, as it is undoubtedly the most perfect chuck ever designed for use in connection with monitor and chucking lathes.

By carefully reading the following description, the practical man will at once recognize the numerous and striking advantages of this chuck. The economy is evident; an enormous saving in the workman's time, equipment, depreciation, and power, results from the use of this chuck.

**CAPACITY.**—The chuck is about 7 ins. in diameter and suitable for turret machines from No. 2 up. It will hold from 0 up to 2 ins. in slip or false jaws and up to about 8 ins. by using special clamping jaws.

**MANNER OF WORKING, NO STOPPING OF THE LATHE.**—This 2-jawed chuck opens and closes instantaneously by lever arrangement attached to the back end of head stock. For round articles the chuck is opened and closed without stopping the lathe. It opens instantaneously wide enough to readily drop any machined article without the use of operator's right hand, wherewith he can in the meantime hold ready another article to be gripped.

**JAWS WILL REMAIN TRUE DURING CONSTANT USAGE,** because the sliding parts upon which the clamping jaws are secured are always fully in their guideway when down to grip size, no matter whether small or large work is to be turned out, thereby insuring an even wear.

**KEPT AUTOMATICALLY FREE OF CHIPS.**—This chuck is so constructed as to keep it automatically free and clear of chips.

**THREADED JAWS.**—Threaded jaws may be used to hold threaded fittings, etc., and the jaws having a throw of 1¼ ins. clear above grip size, will chuck and freely release any threaded article held therein without stopping the lathe or reversing the same while machining.

**TIGHT, POWERFUL HOLD.**—With this chuck a tighter grip and more powerful hold will be obtained than with any other 2-jawed or friction chuck, and the gripping power may be increased or reduced by adjusting the regulating screws in cam bolts, within the sliding parts, accordingly.

**VARIATION.**—Castings or any article may vary in size ⅛ in. without readjusting the jaws. Each jaw is adjustable ¼ in., totalling ½ in. for both. Variation in grip understood to be the last ⅛ in. between the jaws in closing same.

**ONE CHUCK TO SUPPLANT 2 TO 3 SIZES OF THE ORDINARY 2-JAWED OR BOX CHUCKS.**—This chuck holding small articles as well as large ones up to about 8 ins. diameter, practically supplants 2 to 3 sizes of the ordinary 2-jawed or box chucks required for machining work of similar dimensions.

**EXCELLENT DURABILITY, PRECISION, ACCURATE WORK.**—Every practical man is aware of the fact that the ordinary 2-jawed or box chucks soon get untrue, the screws being worn and the jaws becoming loose in their guideway after about 6 months continuous running, thus rendering them unfit for turning out accurate work; while to the contrary, this present style of manufacturing chuck will remain absolutely true for many years, being a tool of absolute precision.

**FIRST CLASS MATERIAL AND WORKMANSHIP.**—This chuck is made of best material and workmanship, principal parts being of steel and hardened. All parts are designed and built with the view to durability and accuracy.

**ENORMOUS TIME AND LABOR SAVER; INCREASE IN OUTPUT INDISPUTABLY 100% MORE.**—Properly used for mass-production, it has indisputably been proven that for a great many articles the output is increased 100% and more, thus saving one hand and one machine. One of these chucks with one lathe will turn out the same quantity of work as two ordinary 2-jawed or box chucks with two lathes.

**EASY ATTACHMENT TO LONG AND SHORT SPINDLE MACHINES.**—This chuck may easily be attached to any kind of lathes and turret machines, long or short spindle.

**ON ACCOUNT OF ITS NUMEROUS AND STRIKING ADVANTAGES** this chuck has been willingly adopted by many concerns in this country, among them the most important firms, and it has given fullest satisfaction, doing all that is claimed for it and even more.

**NO REASONABLE OBJECTION.**—There is no reasonable objection possible to the adoption of this chuck, which is indeed a perfect tool in every respect, making chucking work considerably more economical and simpler than heretofore.

The intelligent, practical man of these modern times will, the longer he uses it, the more give preference to this manner of chucking, and he cannot fail to more and more increase the scope of its usefulness.

## W. L. ABATE,

## 76 West Lincoln Avenue, - Mount Vernon, N. Y.

# FARREL FOUNDRY & MACHINE CO.

## ANSONIA, CONN.

BUILDERS OF

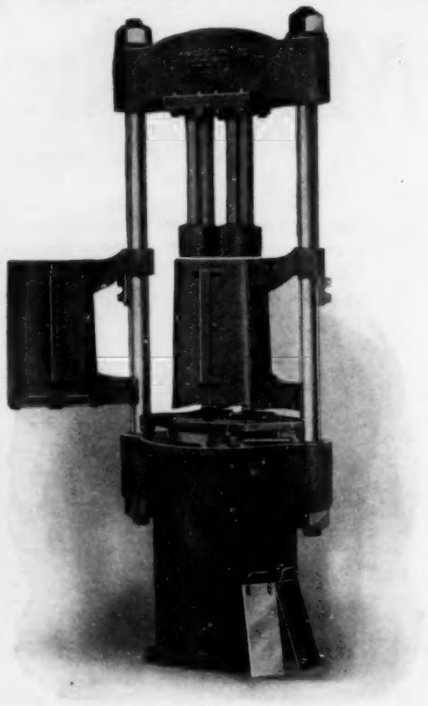
# Rolling Mills

For Brass, Copper, Lead, Tin, Zinc, Aluminum, Britannia, Silver, and the softer metals— up to the largest sizes

## CHILLED and GRAY IRON ROLLS

HEAVY CASTINGS

Alligator Shears, 8 sizes
Gate Shears
Cinder Grinders
Sheet Metal Straighteners
Coil Friction Clutches (Pat.) for any speed or power
Gearing—Cut, Machine-moulded, Pattern.
Shafting, Pedestals, Couplings, Etc.
Roll Grinding Machines
Railroad Cranes
Cabbaging Presses
Lead Pipe Machinery



CABBAGING PRESS
For Making Metal "Cabbages"

# The TORRINGTON MANUFACTURING CO.

TORRINGTON, CONN.

## Finishing Machinery for Brass and Copper Mills to Order

Acid Cleaning, Steam and Sawdust Drying-out Machines.
Power Presses, Single and Double Action Cam or Crank.
Flattening, Straightening and Overhauling Machinery.
Multiple Plunger, Cut and Carry Presses.
Slitters, Scrap Cutters and Coilers in a variety of Styles and Sizes.
Channel Iron Mill Trucks to suit any Requirement.
Metal Saws and Power Shears.
Drawbenches.

SPECIAL MACHINERY AND TOOLS OF ANY DESCRIPTION

# ROLLS

FOR

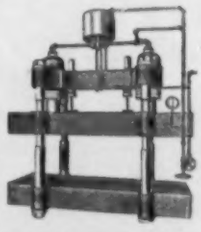
Steel, Iron, Brass, Copper and Rubber Works

## PHILADELPHIA ROLL & MACHINE COMPANY

23d Street and Washington Avenue, Philadelphia, Pa.

Cable Address
"PHILROLLCO, PHILADELPHIA"

Long Distance and Local Phone
LOCUST 825

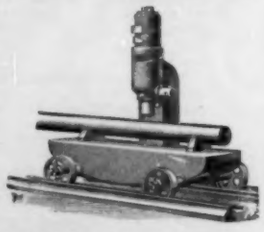


# SHAFT STRAIGHTENERS

Our line of hydraulic shaft straighteners comprises portable types varying from the portable shaft straightener for 3½-inch shaft to the 300-ton power shaft straightener.

We carry portable tools for bending shaft up to 6 inches diameter, also axle straighteners and stationary bar straighteners.

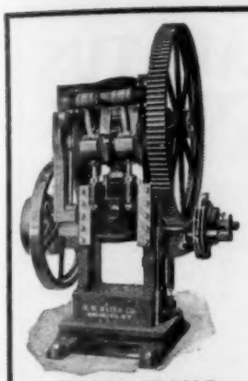
Every tool guaranteed.



## THE WATSON-STILLMAN COMPANY, 26 CORTLANDT ST. NEW YORK CITY

Branch Office, 453 The Rookery, Chicago, Ill.


FOR INDEX TO ADVERTISEMENTS SEE PAGE 32

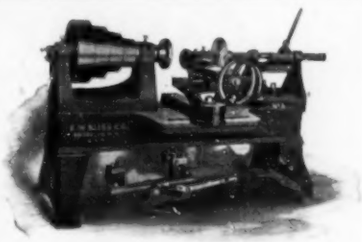


"BLISS" TOGGLE DRAWING PRESSES

# "BLISS"

## Sheet Metal Working Machinery

If you are manufacturing any article out of sheet metal, it is to your interest to know that we are the largest builders of sheet metal working machinery, and have facilities for rapid and economical production which are unequaled. Glad to quote prices and answer questions at any time.



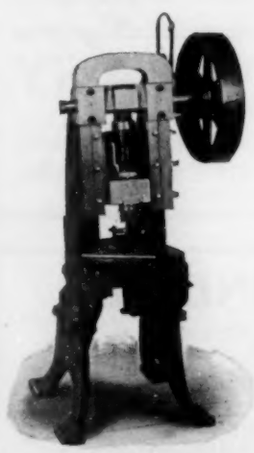
"BLISS" SPINNING LATHE

**PRESSES, DIES, SHEARS, DROP HAMMERS AND SPECIAL MACHINERY**

**E. W. BLISS COMPANY, 23 Adams St., Brooklyn, N. Y.**

European Office: 100 Boulevard Victor-Hugo, St. Ouen (Paris), France

# "THE ATLAS"



NO. 108 IN STOCK

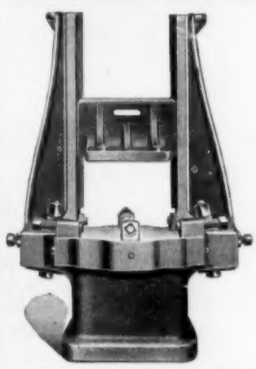
Power, Foot and Drop Presses, Spinning, Edging, and Turning Lathes, Clock or Manufacturing Drills.

Slitters, Flattening and Straightening Rolls. Tube, Rod and Wire Draw Benches.

Special Machines Built on Contract to your Drawings.

**THE ATLAS MACHINE CO.**

**31 CANAL STREET WATERBURY, CONN.**



SIX POPPET DROP.

## SILVERWARE MANUFACTURERS.

This is one of our lines of drops used by SILVERSMITHS and those making a general line of stamped ware. Used in connection with the PECK AUTOMATIC DROP LIFTER it is as easily operated as are blanking presses, being tripped by foot treadle. This leaves both hands at liberty and is not fatiguing. Skilled stampers are not required to work it. Send for our catalog to see what a fine job we make of fitting up the poppets. There are other excellent features. Send for Catalog M.

Miner & Peck Mfg. Co., Prop'rs

**The PECK DROP PRESS WORKS,**

NEW HAVEN, CONN., U. S. A.

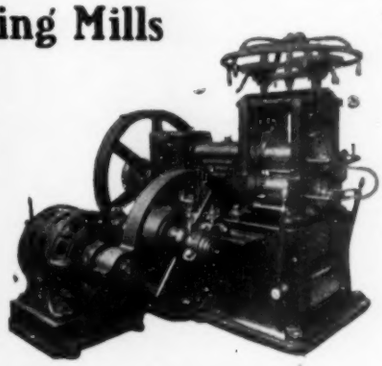
## Cold Rolling Mills

For rolling strips of iron, steel, brass, copper, etc.

Walzmaschinenfabrik

**August Schmitz**

**Dusseldorf 64 Germany**



SAND BLAST.

## Leiman's New Foundry Sand Blast

**PRICE, $45 NET**

Send for Particulars

**LEIMAN BROS.**

**145 Brill Street, Newark, N. J.**
**141 Centre Street, NEW YORK**

## A Small Compound Sand Blast

Price, $20.00. Foot Bellows, $6.00. Pressure Blower, $26.00

WORKS AS EFFECTIVELY WITH FOOT BELLOWS AS WITH POWER BLOWER :: :: :: ::

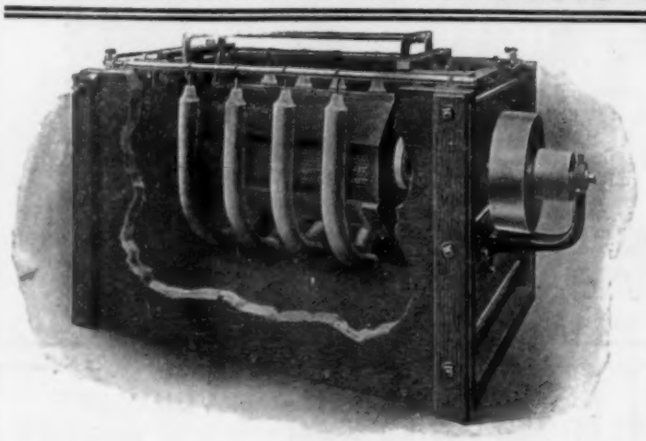
Made of heavy Galvanized Sheet Iron, 12 inches diameter, Glass Top. Fittings of Brass and Iron. SATISFACTION GUARANTEED.

**E. P. Reichhelm & Co.**

FINE FILES, TOOLS and SUPPLIES FOR METALWORKERS

**24 John Street, New York**

# MECHANICAL ELECTRO-PLATING APPARATUS



STYLE "B"

Patented June 22, 1897, Feb. 24, 1903, Oct. 11, 1904.
Other patents pending.

**The most efficient plating apparatus in the market. Over 500 in use by the trade.**

We will finish sample lots of work without charge.

This apparatus is a proved money saver where small work is to be plated. Can be used in Nickel, Copper, Brass, Zinc and Silver Solutions.

No Stringing. No Wire Used. No Metal Plating Trays or Baskets. No Unstringing. No Loss of Metal.

Capacity: 50 lbs. to 500 lbs., according to size.

Basket can be removed at will—without interfering with drive. In larger sizes basket is raised and lowered automatically.

Useful for plating: Bolts, Nuts, Rivets, Screws, Buckles, Ferrules, Typewriter and Sewing Machine Parts, Lamp Fixtures, Saddlery and Trunk Hardware, Carriage Trimmings, Screw Tops, Shells, Stove Fittings, Locks, Keys and small work.

**Apparatus is Used for Electro-Galvanizing Small Articles**

**We Can Furnish a List of Over 200 Users of this Apparatus. Many of the Larger Firms Are Using 10 or more**

**WRITE FOR BULLETIN No. 113**

## The HANSON & VAN WINKLE COMPANY

**Manufacturers of Dynamos from 50 to 5,000 Ampere Capacity, and all Supplies for Electro-deposition.**

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**219-221 Market Street,**
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Branches
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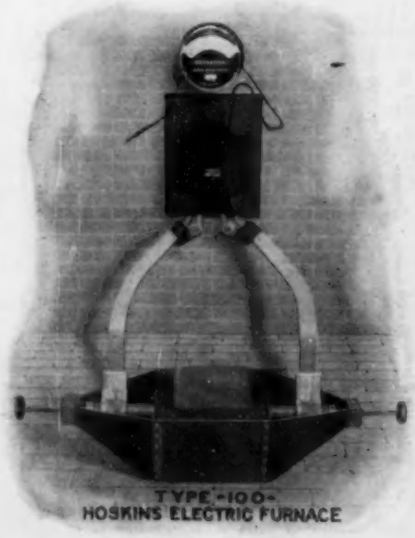

TYPE -100-
HOSKINS ELECTRIC FURNACE

**A new Resistance Type Electric Furnace. A Crucible Melting Furnace. Built in any size to melt any metal. Can be used on Alternating circuits only**

Patented March 24, 1908.

Regulated for any heat with certainty in the furnace chamber; no rheostat to waste heat.

## The HOSKINS COMPANY

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**Electric Furnace and Heat Gages**

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Will pay very highest prices for materials containing above 2 per cent. copper. Upon receipt of 2 oz. samples we will submit best prices on any of the following named materials: Grindings, Polishings, Buffs, Tailings, Sweepings, Skimmings and Washing Mud.

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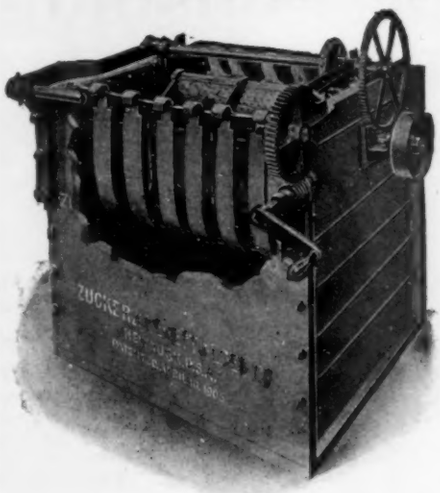
# THE ROTOPLATER



Patented in U. S. and Canada, April, 1906.

**Plating and Finishing at One Operation in Nickel, Copper, Zinc, Brass or Bronze.**

All sorts of small work, such as nuts, bolts, screws, etc., can be economically and quickly Plated and Finished at one operation, labor of stringing also being done away with. The apparatus is fitted with a Crank and Gear by which the cylinder can be raised out of the solution to receive or discharge work. We make for this apparatus special curved anodes so that the anode surface is at all points equidistant from the work.

Patented in U. S. and Canada, April, 1906.

**We should be pleased to receive small sample lots of work to be plated without charge to demonstrate the practicability of the apparatus, or it can be seen in practical operation at our works.**

**For further particulars and prices apply to the Patentees and Sole Manufacturers,**

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**Electro-galvanizing Outfits Without Royalty on Solution. Low Voltage Generators; and Direct Connected Generator Sets, 50 to 10,000 Amperes Capacity. Complete Plants Installed and All Supplies for Electro Plating and Polishing.**

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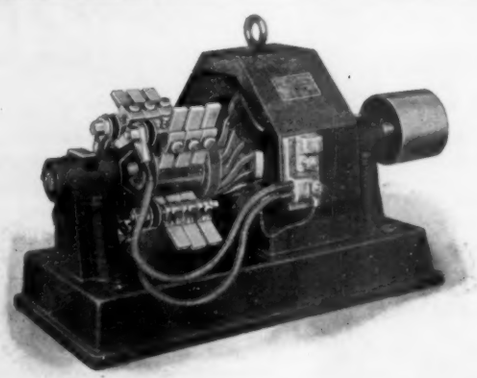

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The Reliance Dynamo, manufactured by us, is giving excellent results to the trade. It has slow speed, compound or shunt wound, and will not heat or spark. If interested write for further particulars.

We are manufacturers and dealers in plating and polishing supplies of every description. Let us hear from you when in the market, and will cheerfully submit quotations or samples.

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**99-101 S. Clinton Street, Chicago, Ill.**

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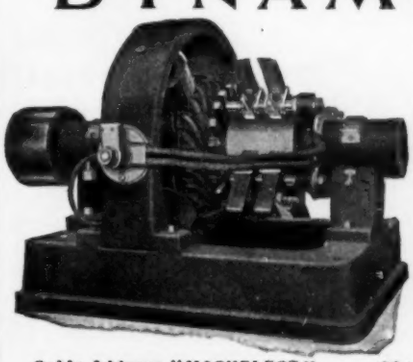

For Electro-Plating, Galvanizing and all other low voltage work.

**50-8000 Amperes, 3-30 Volts.**

**Shunt, compound and separately excited.**

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**MANUFACTURER OF**

## Brass and Nickel Platers' Supplies

**40 and 42 WITHERS STREET**
**BROOKLYN, N. Y.**

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# No. 20 Double Arbor Polishing and Buffing Lathe

**Can be belted from overhead shaft or from shaft below floor**

The two independent arbors permit two workmen on the same machine to be independent of each other. One may stop to change his wheel or for any other purpose, while the other continues his work. This feature contributes to a great saving of time. Built for polishing or buffing large work and is especially adapted for stove manufacturers. Each spindle is provided with tight and loose pulleys and can be run direct from main or jack shaft. The loose pulleys are one inch less in diameter than tight pulleys, which tend to relieve the strain on belt and bearings when belt is run on loose pulleys. Loose pulleys are also provided with patent oiling device which assures positive lubrication and prevents heating or binding on the shaft.

When lathe is belted from shaft below the floor, HOOD is provided completely covering the pulleys. SHIFTERS are PROVIDED for each SPINDLE to SHIFT BELT to stop or put the machine in motion.

**This illustration shows the Lathe to run from overhead shaft**

**Ring Oilers in each of the out side bearings**

**Write for full description and price contained in Catalog M.**

## Bennett & O'Connell Co., Inc.

**Complete Electro-Plating Outfits**
**Polishing and Buffing Materials**
**97-99-101 South Clinton Street**
**Chicago**

SOMETHING NEW FOR THE BUFFING, POLISHING AND GRINDING ROOM

Patent Separator

## V. & L. Patent Separator, Hood and Metal Saving Device

**HUNDREDS OF THEM IN USE**
**WHY NOT BE UP-TO-DATE?**

This Separator is constructed to separate the lint and dust from the air. Also can be placed next to the fan and collects material in bottom.

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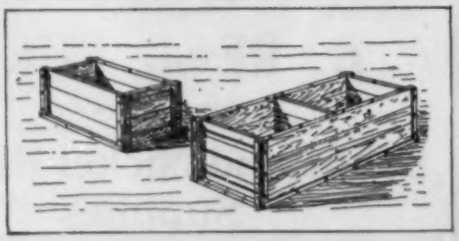
Patent Hood and Metal Saving Device

**Save Money**

The hood and metal saving device for polishing or grinding wheels can be attached easily to machine and saves from 5 to 20 lbs. of metal per day.

TANKS



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**A SPECIALTY**

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## GOLD MEDAL AT JAMESTOWN

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**FOR TWELVE YEARS**

we have been manufacturing a high-grade Acid-Proof Vitrified Non-Absorbent Brick suitable for Acid Tanks, Plating Room flooring, etc., etc.

These brick immersed in a 50% Sulphuric Acid solution for several months show no signs of deterioration.

We also have the same material pulverized to mix with Portland Cement in place of Sand in laying the Brick.

INQUIRIES SOLICITED.

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Sheet Metals that save cost in manufacturing and do not rust

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**AMERICAN NICKELOID & MFG. CO.**
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**Brass, Copper and Steel Wire Brushes**
**An assortment of Machine and Circular Brushes.—**
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**Repairs Promptly Attended to.**

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ALL KINDS
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For a liberal compensation I will teach my process to manufacturers and fit up plants.

I make a specialty of etching plates in steel, copper, brass and zinc for transferring and embossing. Also silverware, including such articles as mirror, brush and comb backs, book and album covers, trays, souvenir spoons and similar articles.

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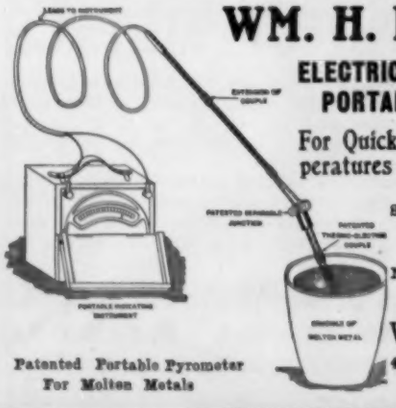

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FOR INDEX OF ADVERTISEMENTS SEE PAGE 32

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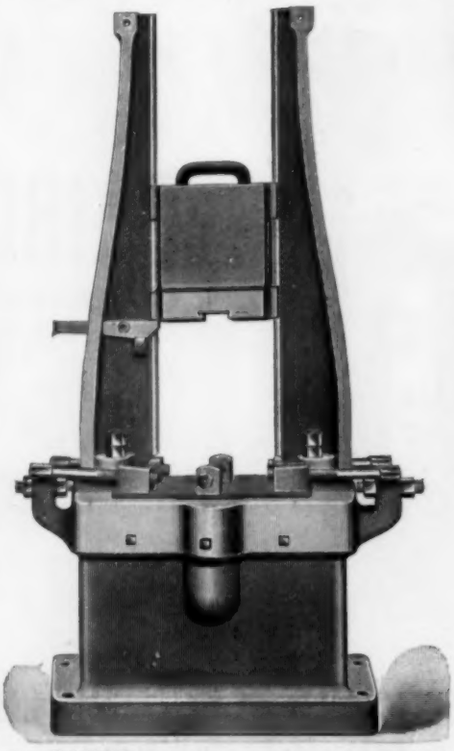

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